INDUSTRIAL PHOTOGRAPHY

APRIL 1961 AVERAGE MONTHLY CIRCULATION: 33,400

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- **MICROFILM ROUNDTABLE: Q AND A'S**
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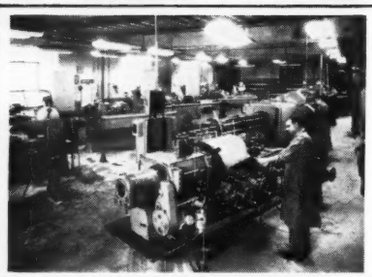

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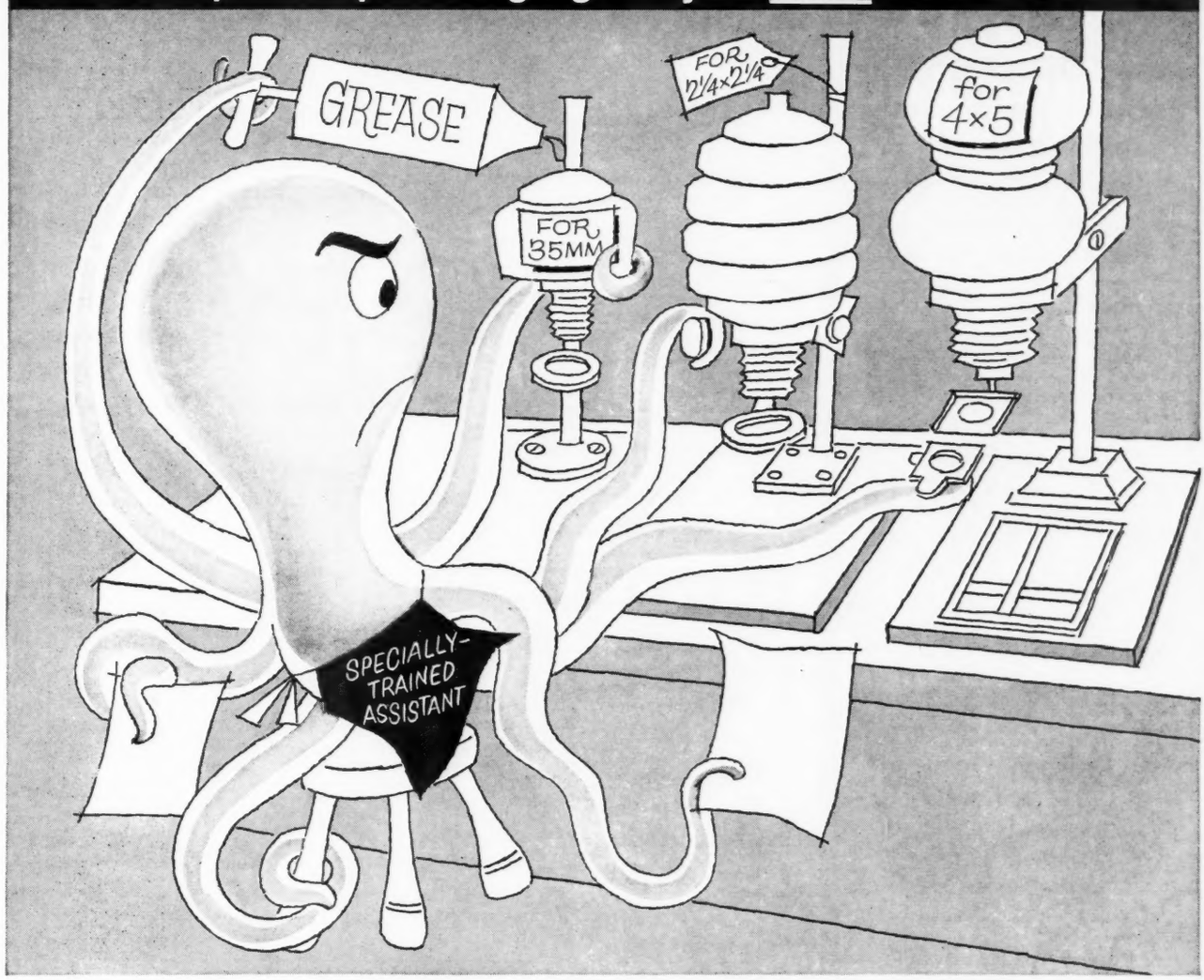

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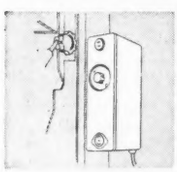

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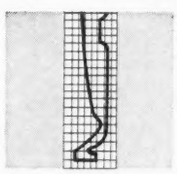

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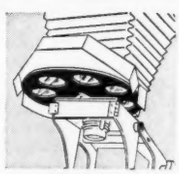

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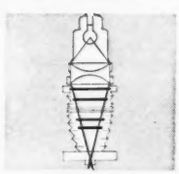

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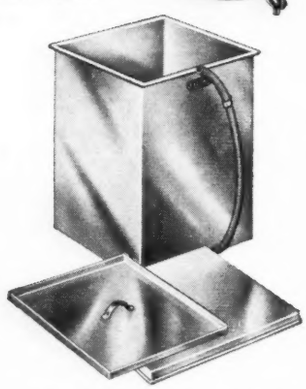

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Industrial Photography

THE MAGAZINE SERVING IN-PLANT TECHNICIANS IN BUSINESS, INDUSTRY, GOVERNMENT AND SCIENCE

APRIL 1961

CONDENSING THE COLUMNS 4
Capsule summaries of what each columnist has to say this month — plus the story behind the cover photo.

SPOTLIGHT ON MICRORECORDING

NMA CONVENTION PREVIEW 21
Here's what's in store at the annual convention of the National Microfilm Association being held in Chicago, April 4-6.

SPECS AT THEIR FINGERTIPS 22
Naval engineers find that a winning combination of unitized microfilm images with EAM cards means instant accessibility of all drawings.

FILE CONTROL WITH MICROFILM 24
Automatic indexing and time-saving magazines are just two of the latest microfilm marvels which give Eastman Kodak ready access to back records on film.

MICROFILM ROUNDTABLE 26
Experts in every facet of this thriving industry put their heads together and come up with answers to questions which you have sent us during the year.

YOU CAN "SO" FIND IT 32
A guide to indexing every kind of microfilm.

MANSIONS ON MICROFILM 34
Miniaturization of blueprints has changed the modus operandi of one architect.

ALSO: SELLING MANAGEMENT, Page 30 . . . DYEBACK VS. NON-DYEBACK, Page 72

GM'S LINER CAMERA 52
A custommade camera built around the classic pin hole principle serves to photograph cylinder liner port deposits of engines at GM.

CORE OF THE MATTER 54
A film comes to the rescue, helping Osborn salesmen promote an 8-ton coremaker.

ALSO: WHEN SPARKS FLEW, Page 36 . . . PROJECTOR MAINTENANCE, Page 56 . . . IAVE, Page 71

INDUSTRIAL REPRODUCTION

DIFFICULT JOBS MAY HAVE SIMPLE ANSWERS 45
Read how Denstman and Schultz set up to reproduce a combination of electronic waveguides and printed circuit boards to exacting accuracy.

WHAT DO YOU DO WHEN THE PAPER WORK IS TOO MUCH? 46
A paperwork bottleneck in the engineering department at Albany's Department of Public Works was effectively solved by a switchover to diazo.

PARTNERS IN SERVICE 48
The commercial and in-plant reproductionist need not be at odds with each other. Here's how one complements the other.

DEPARTMENTS

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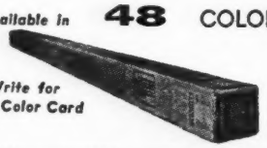

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Condensing the Columns

INDUSTRIAL ROUNDTABLE 8

Morris Gordon shot up several rolls of the new Kodachrome II under varied light conditions. Read what he has to say about the film.

TECHNICAL TRENDS 11

Several of Ashton's loyal readers pointed out that he had neglected to cover accessories shown at Photokina. This month he rights the situation.

INSTRUMENTATION 14

Botanical researchers have made an interesting use of transparencies in recording the color of flowers grown in different environments.

About This Month's Cover

Max Mesner, Radio Corporation of America engineer in charge of building the TV camera for the TIROS II weather satellite, is seen giving his brainchild the once-over. The shot, used originally on the cover of RCA's *Electronic Age*, was taken by a team of photographers — Herman Meyer and John de Milia of Carl Byoir and Associates. Why two photographers? Byoir feels that with two men on the job one can do the selling job (suggest different angles, loosen up the subject) while the other mans the camera. DeMilia and Meyer worked with an Eastman 4 x 5 view camera equipped with Kodak wide-field 100mm lens. A Heiland flash set-up side-lighted the subject which was shot on Ektachrome E-3, using an exposure of 1/50 sec. at f/22.

MOVIE CLINIC 16

Edgar Parsons gives step-by-step instructions on how to dub in music in a column titled "Multiple Sound Tracks: Preparation."

PATENT NEWS 58

This month Dr. Sipley discusses four varied patents: a microscope attachment for cameras, a sound-on-film device, a darkroom camera and border print apparatus.

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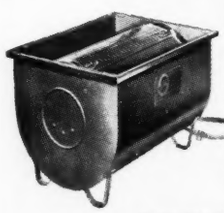

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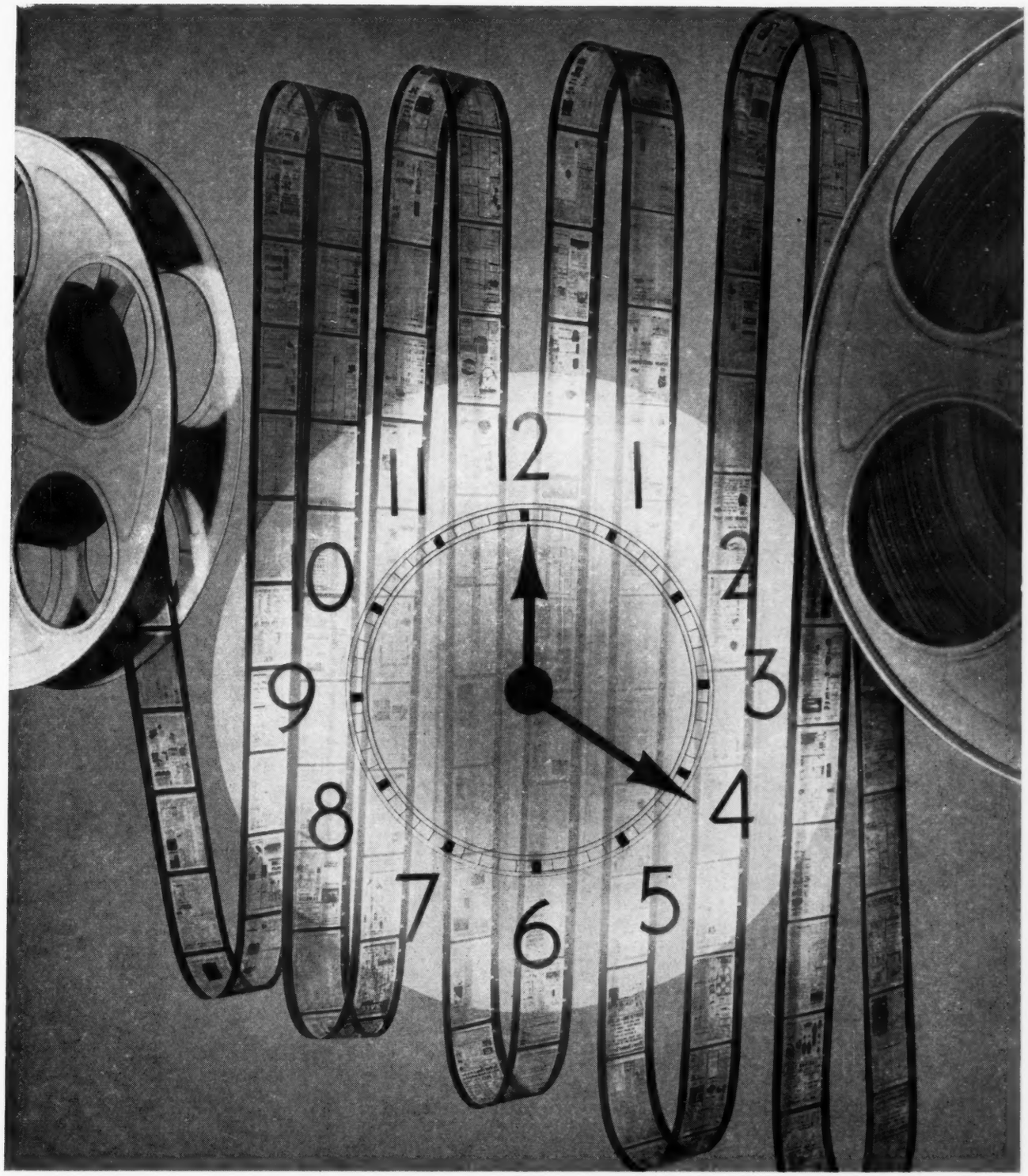

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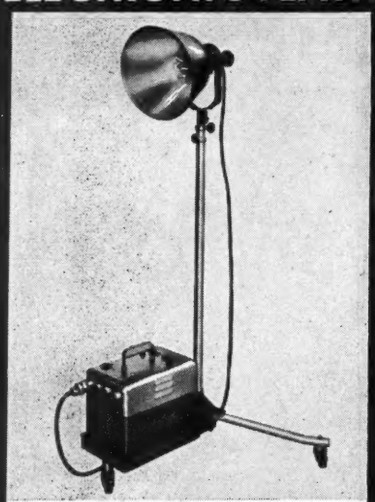

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editor's mail

MITCHELL BADLER, Editor

More About Lenses

I was very interested in your Long Lens Directory (February 1961, pp. 34-36) but wish you had included more data. I am particularly interested in information on the lenses available for the Canon and Super Canomatic R cameras. You indicate that lenses are available for the former in sizes from 85-1000mm and in the latter from 100-300 mm. I would like more information on both lines and, while I know that I can get the specs directly from the distributor it would have been useful to have it all in one listing. — Irv Chapman, Radio Press International, Washington, D. C.

Reader Chapman's comments are understandable. The inevitable space limitations prevent listing of ALL *lenses available from any distributor or manufacturer. In addition, the constant release of new items in a line make any attempt at comprehensive coverage impossible. The best source for information on any* ONE *line is always the individual manufacturer or distributor (A list of these with their addresses appears on p. 36, February issue). However, for the benefit of reader Chapman and others who are particularly interested in the Canon line, the following are the major long focus lenses available for the Canon at this writing: 85mm f/1.9, ($179); 85mm f/1.5 ($235); 100mm f/2 ($149.95); 100mm f/3.5 ($110); 135mm f/3.5 ($125); 200mm f/3.5 ($199.50); 400mm f/4.5 ($471); 600mm f/5.6 ($550); 800mm f/8 ($650); 1000mm f/11 ($750). Complete details on these lenses, as well as on the lenses available for the Canomatic R and Super Canomatic R is available directly from Scopus, Inc. 404 Park Avenue S., New York, N. Y.*

An Important Clarification

I would like to take issue with a statement made in an article in your February 1961 issue ("Nurse, My Single-Lens Reflex, Please." p. 48). Under the subheading "Choice of Lighting, Film" this statement appears: "It (strobe) is safe to use in gaseous environments." This appears to be misleading. . .

As a Medical Photographer, I doubt if any of my colleagues would dream of taking a standard strobe light into a gaseous environment such as an operating room if ether, Cyclopropane or many other gases were in use without first checking completely). . . . I assume that there are some strobe lights which would be safe under these conditions but I would never (repeat, never) make photographs in surgery with electronic flash.

I hope you will be able to clarify this. — Alfred Spitzer, New Britain General Hospital, New Britain, Conn.

Reader Spitzer is right. Although the article, based on material by Eugene M. Fusco, M.D., which originally appeared in the Ohio State Medical Journal, referred mainly to office practice his original manuscript took note of the dangers. To quote the doctor: "It must be remembered that both speedlights and flashlamps are capable of igniting volatile or inflammable gases when sufficiently concentrated." Unfortunately an over-eager copy editor omitted this vital sentence.

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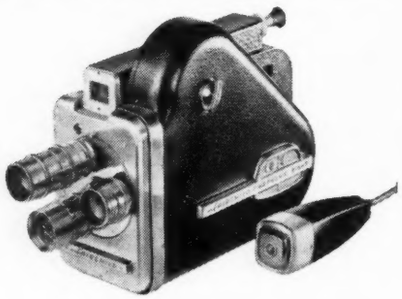

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industrial roundtable

by MORRIS GORDON, *Western Electric*

The New Kodachrome

For more years than I care to remember, I have been a most devout user of 35mm Kodachrome film. It had its weaknesses. Under certain conditions it was too contrasty; under others it was too slow. For purposes of reproduction the film had very little latitude, the exposure having to be almost right on the nose. But all in all, it was great film. In fact, in my estimation, there was no film that approached Kodachrome for fine grain structure.

Early last December the photographic press was treated to a pre-marketing showing of Kodachrome II. This ASA 25 film will eventually replace the old Kodachrome.

In New York's Hotel Commodore, Eastman Kodak showed us photographs of the same subjects, made under the same conditions with the old and the new Kodachromes. The difference was amazing. The old film when used under contrasty lighting conditions showed little or no detail in the heavy shadows when the exposure was for the highlights, or the highlights were burned out if the exposure was set for the shadow areas. But with the new film, which can stand over- or underexposure of about 2½ stops, regardless of whether the exposure was set for the shadow or highlight, the shadow had substance in its detail and the highlights were excellent.

After the showing, small quantities of daylight-type (35mm still, 16mm and 8mm movie) were given to the photographic writers and editors for their own experiments and what follows is what I found out about the film from my own tests.

Grain Qualities

The grain is even finer than that of the old Kodachrome. I studied with a 10-power microscope photographs I made with the same lens mounted on different cameras, using both the new and the old Kodachrome. It was obvious that the grain structure of the new film showed a definite improvement over the old.

Speed

The speed of the new film is two-and-a-half times that of the old. For the professional this means that he won't need a supplemental color film when lighting conditions become poor. If light becomes very bad, there is always the High Speed Ektachrome, which serves a definite purpose in an emergency, but like every high speed film it is a compromise, losing quality in favor of gaining speed. Also, the need of a skylight filter has been minimized, since the film is of a much warmer quality.

Latitude and Contrast

While the old Kodachrome had hardly any latitude, the new film is acceptable from two-and-a-half to three stops on either side of under- or overexposure. This means that it is possible to shoot in deep shadow and still get good background quality, despite the fact that the background may be suffused with the strongest sunlight.

Color Quality

Excellent. The only real

continued on page 51

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Of the fifteen 1960 Industrial Film Awards, **ten went to films shot with Arriflex 16mm and 35mm cameras**...a record unmatched by any other camera! A record approached only by Arriflex's winner-majority showing last year.

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*ANNUAL INDUSTRIAL FILM AWARDS-
conducted by the publishers of
Industrial Photography magazine.

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Circle No. 507 on Post Card

technical trends

by GEORGE ASHTON

Accessories and Sensitive Materials

We have been flattered by the response of readers to our coverage of Photokina. The only criticism has been that we did not review deeply enough the accessories and sensitive materials on view. We have tried to remedy that situation this month.

With the exception of the new Polaroid materials with a 10-second processing time, there were no outstanding developments in monochrome materials introduced at Photokina.

In color materials, however, Agfa had on show transparencies made on a new artificial light type reversal film coded CK 20. For its speed rating of 80 ASA, this film showed excellent sharpness and freedom from grain, together with pleasing color reproduction. All the color prints on the Agfa stand, together with those Agfacolor prints on the stands of other exhibitors, were made on the new type Agfa color paper. For color prints made from unmasked negatives, these pictures showed reds of excellent saturation, undoubtedly due to the use of a new and improved magenta coupler.

Agfa also demonstrated videotape recordings made on their tape, using Ampex equipment.

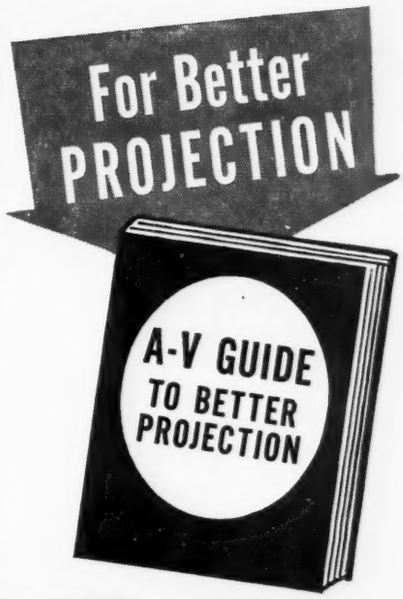
The forerunner of the Asahi Auto Spot Matic camera using a cadmium sulfide photo-resistive cell for automatic exposure control is the Asahi Spot Exposure Meter. Although the camera was not shown by Asahi, the meter was. It consists of an objective lens, a reflex viewing system with a reflex mirror, a 1.6 times eyepiece and meter scales for reading the intensity of the light falling within an area in the center of the viewing screen. The included angle of this area is three degrees while the viewing screen covers an angle of 21 degrees. The reflex mirror is coated with a filter layer, which corrects the high red and green sensitivity of the cell and gives the meter a substantially equal sensitivity throughout the visible spectrum. The meter has a two-position sensitivity control and is powered by two 1.3-volt mercury batteries and a 22.5-volt dry cell.

The most interesting of the many accessory items on show on the Franke and Heidecke stand was the Automatic Universal Rollei projector. This is the first projector to use two separate magazine channels to screen either 2 x 2-inch or 2¾ x 2¾-inch slides. The left-hand magazine holds up to 30 2¾ x 2¾-inch slides, while the right-hand magazine channel can take either 30 or 50 2 x 2 slides holding transparencies up to 4 x 4cm. in size. The two mount sizes can be projected separately or in mixed sequence. The automatic control includes forward and backward slide changing, repetition of any slide, and motor-driven focusing over the whole focusing range. All controls may be operated by a remote cable. Lenses of three focal lengths, 4¼ inch, 6 inch and 10 inch, are available, and either 300-watt or 500-watt lamps can be fitted.

Two other interesting gadgets on the F & H stand were a pentaprism finder for all Rollei models with detachable focusing hood and a projector adapter for these cameras.

This latter device consists of a small lamphouse containing a six-volt 45-watt lamp and a

continued on page 55



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An extremely useful guide to anybody who is using or considering using *any* type of projection equipment. Covers motion picture, silent and sound, slide, slide-film, opaque, overhead projection for all types of users—schools, churches, industry, sales. Covers every phase of projection—proper arrangement of projection facilities, acoustics, equipment, screens. Fully illustrated. Is a gold mine of valuable information, complete, thorough—but easy to understand. Fill out coupon for FREE Copy—also full information, specifications on the complete line of Radiant modern projection screens for every need.

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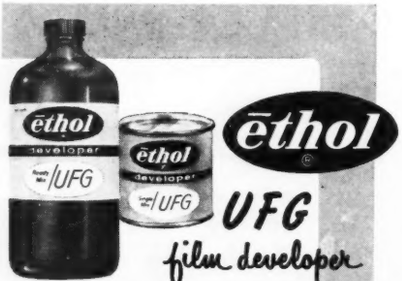

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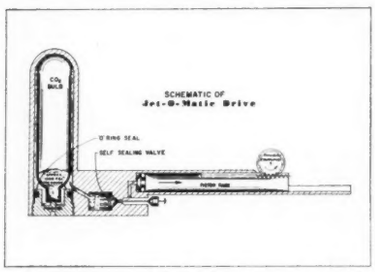
Circle No. 571 on Post Card

new products

Reviewed by Bert Lefkowitz

Novel 35 101

Innovations in film advance mechanisms have been few since spring wind, electric motors and thumb lever advance devices became popular. An entirely different method which combines speed with a unique power source has been



incorporated in the Graphic 35 Jet introduced in March by *Graflex*. Power for the Jet-O-Matic Drive is supplied by a CO_2 cartridge that fits into a chamber within the camera. A two-position shutter release takes the shot and when pushed a little further lets gas pressure take over to transport the film and cock the shutter. Each cartridge will transport from six to eight rolls of 20-exposure film. Other features of the new 35 include left and right hand pushbutton focusing, a built-in coupled exposure meter and red flag end-of-film warning. The Jet is equipped with a 50mm Graflex Optar *f*/2.0 lens set in a Copal SVK shutter. Focusing is accomplished at the focal plane since the lens is firmly set into the body.

File Control System 103

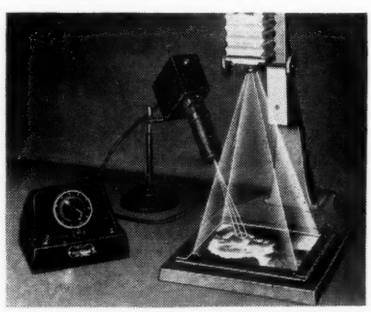
A completely new system for file control has been announced by *Recordak Corp.* The system combines microfilm indexing and EAM cards which form the index for documents on the microfilm. It has been abbreviated in nomenclature to FICO (File Control) and consists of a combination of camera-reader and printout units. The unit components, exact models of hardware, vary from installation to installation depending on needs. In one test installation, over 220,000 documents on film are stored in a single file drawer. Recordak sets up the high speed storage and retrieval system as a complete system although, as usual, individual units are available.

Standardized Viewer 102

The acceptability of color prints, as any frustrated color technician will tell you, is affected by a great many subjective factors. In addition, what may look right under certain conditions can appear different depending upon the type of inspection light used for viewing. In an effort to eliminate these variables, *Macbeth Corp.* has designed what they call an Avlite Reflection Print Viewer, Professional Model R-124, which uses a special fluorescent tube. This tube provides complete color content throughout the spectrum and at a color temperature of 3800K which is midway between incandescent and average daylight illumination. The viewer measures 16" wide, 16½" high and 10" deep and operates from 110 volt AC.

Improved Timer 104

A new model of the Elwood Photric Timer, the Model 4000, has been announced by *Fotomatic Corp.* The



combination densitometer timer is designed to automatically control length of exposure by measuring any small portion of the projected image and turning off the enlarger when exposure is complete. New features include an interchangeable optical system which permits "reading" much smaller areas, footswitch outlets, increased sensitivity and paper ranges, and a new case and photocell head design. Price: from $176.

Kodachrome II Processor 105

Simultaneous processing of both 35mm and 16mm Kodachrome II is provided by the Duplex Processing Machine introduced by *Arri-*

continued on page 73

THE INSIDE STORY ON SINKS

Not everything is apparent to the naked eye. One sink may look just like another. But, when you are making an investment in as important a piece of equipment as a photographic processing sink, just looking is not enough – you must get all the facts . . . the "inside story."

Take the "inside story" on Bar-Ray Photographic Processing Sinks. First, there's technical "know-how." A Bar-Ray sink is the product of 15 years of producing critical processing equipment for the X-Ray as well as photographic fields. "Know-how" like this is not visible to the human eye . . . yet it can be "seen" in every quality detail of the finished products from Bar-Ray. Products that have been custom-engineered for maximum durability, minimum maintenance. Next, let's go "inside" the Bar-Ray sink. Instead of just a shell of a single sheet of steel, the walls of the Bar-Ray sink are made of 2 sheets of type 316 Stainless Steel . . . with 5 ply Marine plywood plus ½" thick insulating building board sandwiched between. Hidden from the eye this exclusive inner insulation helps provide the critical temperature control so necessary in color work . . . plus structural durability for lifetime service. Now, turn the Bar-Ray sink around. All plumbing (and electrical work, where necessary) is *built-in* . . . and tested at the factory. You simply connect water supply, drain and power . . . the savings in costly installation charges are huge (average plumbers' installation, labor and parts, costs can increase normal sink prices by 10 to 40%). And if you move . . . your installation "moves" with you.

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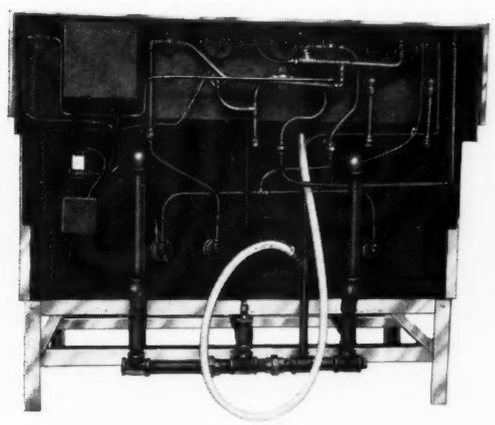

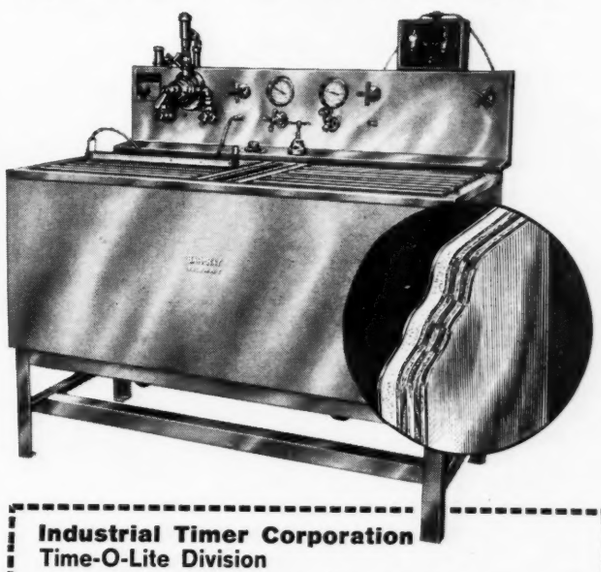

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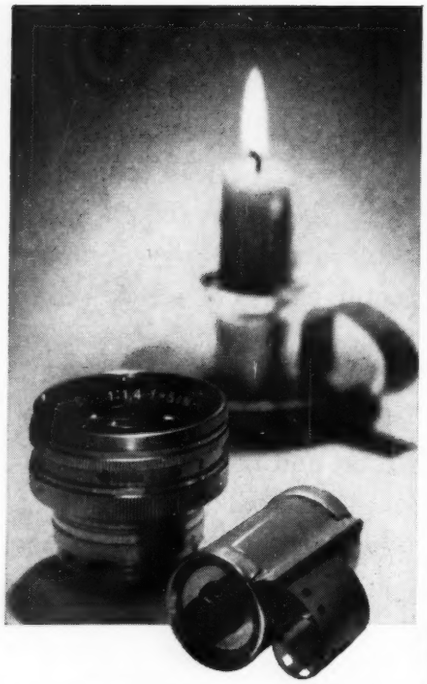

IS YOUR METER AS 'FAST' AS YOUR FILM AND LENS?

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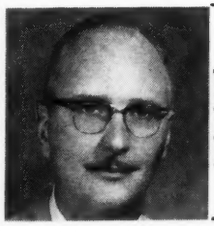


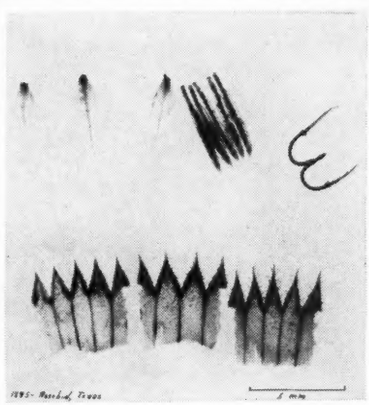
photo-instrumentation

Coordinated by Paul A. Lathrop

Recording Growing Things

WARREN P. STOUTAMIRE
Cranbrook Inst. of Science

The Cranbrook Institute of Science in Bloomfield Hills, Michigan, finds that photography is a useful tool in recording variation in living plants, particularly when studies must be made in the field. The Institute is presently using it in a study of the genus *Gaillardia,* a group of approximately 15 species of plants native to the southwestern United States, northern Mexico and Argentina. Photographic records are being kept of the plants as they grow in the Southwest, as they grow in a greenhouse and as they grow in an experimental garden in Michigan.



WORK PHOTO used in plant studies at Cranbrook Institute.

The idea is to determine, by recording variations, how environment modifies the underlying genetic system. The photographic records supplement standard herbarium specimens, field and laboratory records and microscope slides, in some cases giving information which cannot be clearly presented in any other way.

Flower color is highly variable over the ranges of some of the species, and, we have found, the most convenient and accurate way of recording it is to make Kodachrome transparencies of plants growing in nature. These are later compared with the colors produced in greenhouse plants grown from the same seed and are frequently quite different. Greenhouse-grown plants seldom have the growth form of their naturally growing parents, and these transparencies are a valuable record of what response these plants make to contrasting environments.

A great deal of work is involved in examining microscopic detail of flowering heads. Structures are dissected, stained, mounted on microscope slides and photographed. It is much easier to use these prints in comparing variations than to use dried herbarium sheets. If a single character is under consideration, say the shape of corolla lobes, these are cut out and mounted side by side to give an easily examined record of the complete species variation in this structure.

Most of the research time at Cranbrook is involved with hybridizing the races, growing the hybrids either in a garden or the greenhouse and studying the behavior of chromosomes in the hybrids as compared to their wild parents. Microscopic examination of chromosomes in hybrids is time-consuming, and significant material is recorded photographically both for permanent records and for later use in publications.

We have used an Exakta for

continued on page 60

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movie clinic

Multiple Sound Tracks: Preparation

by EDGAR PARSONS
Audio-Visual Department
U.S. Chamber of Commerce

One way to record the musical score for a motion picture is to engage a composer to write the complete score, hire an orchestra and record it, with the picture on the screen. Unfortunately few industrial film producers can afford either the luxury of a competent composer or that of a full orchestra. Most business-film music comes from one of the several excellent film music libraries.

Let us assume that you have a film crying for good musical support; that you have already recorded the narration, with some dialog sequences that were recorded at the time of the filming. How do you fit the music to the film in proper sequence so that it will produce the effect desired, and heighten the emotional response to your efforts?

The first step is to select musical moods that will complement, but not clash with, the mood of the picture with its dialog-narrative sound. Then transfer (re-record) all musical selections, together with the voice tracks, to a uniform editorial medium such as 16mm magnetic, 17.5 magnetic or 35mm magnetic film. Now you have several rolls of magnetic sound track which will fit into a synchronizer for the purpose of editing opposite the corresponding workprint picture. Assuming that there are no overlaps in the voice tracks — that is, the narration does not overlap the dialog — the voice tracks can be connected for one continuous "A" roll and be placed in the synchronizer with the picture. Check this track out first, marking "start" opposite the picture "start" and establishing synchronization throughout. Although a Moviola is useful for this, it can be done with a picture viewer and magnetic sound reader placed in position opposite each other.

Cut In Music

Now you are ready to "cut in" the music, and it is probable you will need to divide the music tracks into "B" and "C" rolls. Start with the main title music (marking "start" as before) and place a roll of unmodulated magnetic sound stock in the next sprocket of the synchronizer. Unless the main title music is precisely the correct length — and this is unlikely — you will want to change over to background music at approximately the point at which the narration commences. This is accomplished by overlapping the "B" roll (main title music) with the music on the "C" roll by a few feet. The changeover is accomplished smoothly when the three tracks are mixed. Note the exact footage (from the "start marks") on a cue sheet for later use in mixing. Each subsequent music change is accomplished in the same manner: overlap the outgoing and incoming music tracks a few feet for smooth transition.

Suppose, now, you want the music to come to a natural ending at the close of any scene. You have two choices, assuming the music to be longer than the scene: you can make a cut in the music at a place where it will be unnoticed, and thus make the music and picture "come out even"; or — and this will usually create less of an abrupt cut —

continued on page 65

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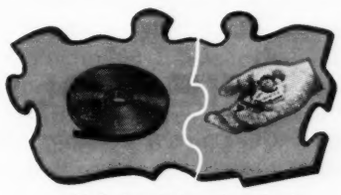

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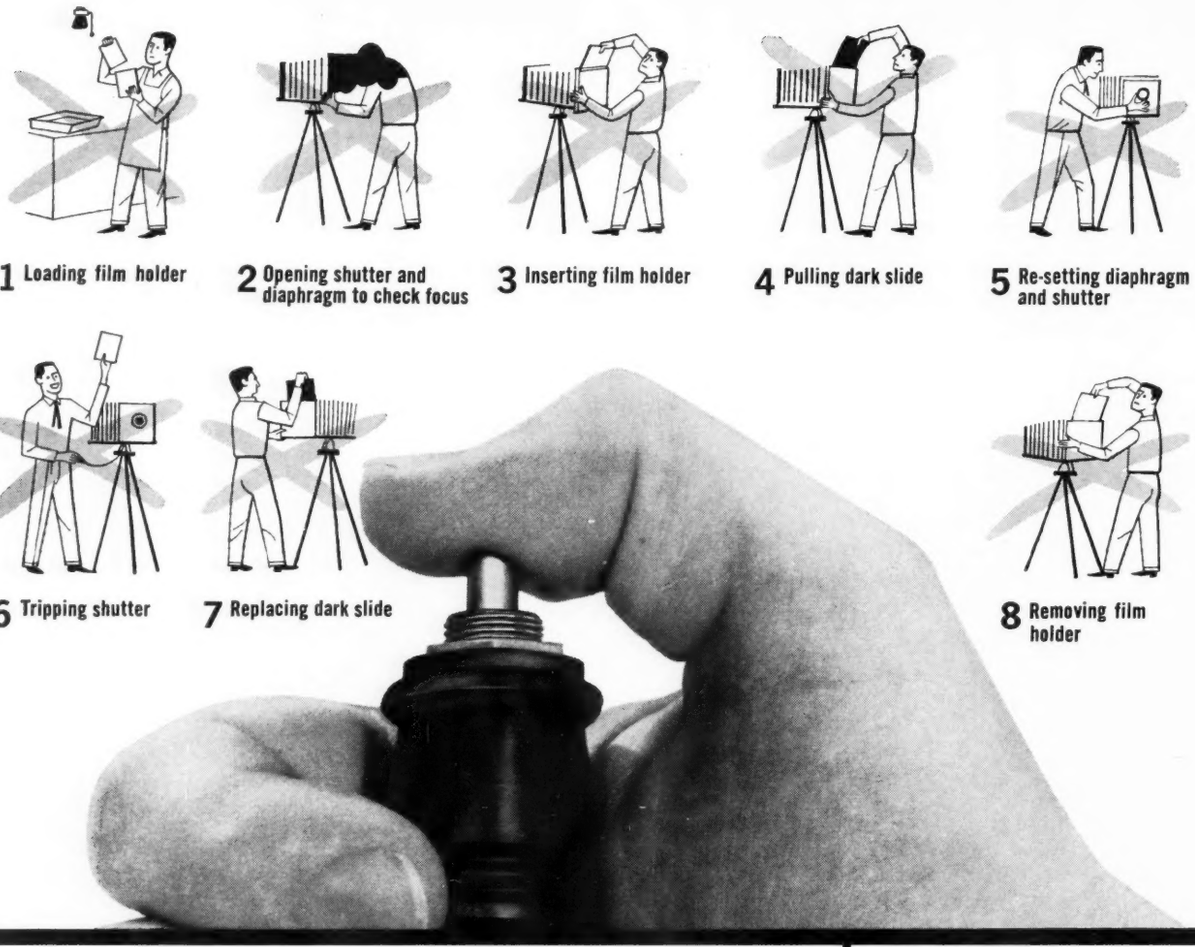
1 Loading film holder
2 Opening shutter and diaphragm to check focus
3 Inserting film holder
4 Pulling dark slide
5 Re-setting diaphragm and shutter
6 Tripping shutter
7 Replacing dark slide
8 Removing film holder

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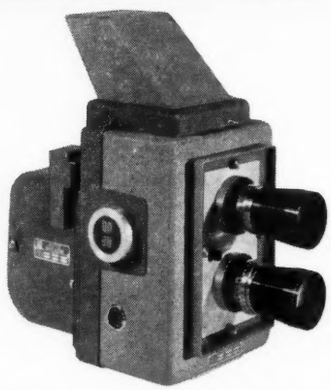

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Industrial Photography

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shop talk

A Dynamic Industry

"Systems and Standards — A New Era in Microreproduction" is the theme of the tenth annual convention of the National Microfilm Association (see page 21). It is significant that a trade organization which has not yet become a teenager as professional societies go has selected such a dynamic theme. Everything about the microfilming art is on the move. Equipment for miniaturization is constantly improving and being priced to fit any organization's budget . . . portable readers have brought microforms out of the library and into the office and drafting room . . . Department of Defense standardization has lifted technology to a professional level . . . mechanized retrieval and copy systems are increasing the scope of applications immensely . . . microfilm's compatibility with electronic data processing is proven daily as new recording-retrieval-and-reproduction systems are born. There is no better place to get all the latest facts and information, all the latest thinking and ideas, than at the NMA's annual convention.

We are happy to salute NMA on its tenth birthday and proud of the role INDUSTRIAL PHOTOGRAPHY has played in contributing to the industry's growth. We look forward to partnership with NMA for many years to come.

THE EDITORS

● The New York chapter of the Society of Photographic Scientists and Engineers has a standing invitation to industrial photographers to attend its meetings. A majority of the chapter's members are from industrial concerns including Henry Croix, Industrial Photo Products, Inc., president; Richard Haard, Bell Labs, vice-president; Marcel Verdooner, Alco Gravure, second vice-president; James Howard, Interchemical Corp., secretary. This month's meeting, set for April 5 at Bell Labs, is a symposium on "The Photographic Efficiency of Light Sources." May's meeting will feature "Advances in Photographic Chemistry." June's will deal with the Gevaert multimask system. Information on the chapter and its meetings may be obtained from Marcel Verdooner, 3215 Arlington Avenue, West New York, New Jersey.

● The Society of Reproduction Engineers has recently chartered two new chapters and our hats go off to the hard-working members who earned this recognition. The new groups are Chapter 28 (Hudson Valley, N. Y.) and Chapter 29 (Syracuse, N. Y.). Officers of the new groups are: (Hudson) Ehret Carlson, IBM Corp., chairman; Joseph Reilly, N. Y. State Department of Public Works, vice-chairman; Philip R. Evans, The Nestle Co., secretary;

continued on page 66

To save decidedly see new low, low prices on

almost every item of photographic equipment in Calumet's line! Why is this possible? Because Calumet has increased its output, streamlined its manufacturing with new tooling, stabilized its proven designs. Besides, Calumet *SELLS DIRECT TO YOU*, not thru jobbers or dealers. Calumet has always given honest value . . . that's why these new lower prices are so significant.

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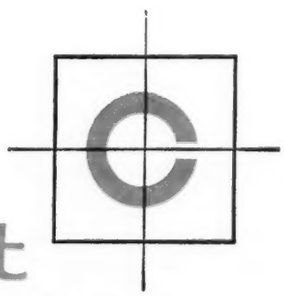

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IP CALENDAR

April 4-6 . . . National Microfilm Association Convention, Hotel Sherman, Chicago.

April 5 . . . Combined meeting of N.Y. Chapter, SPSE, and the IPAA at Bell Telephone Labs, Murray Hill, N.J.

April 4-7 . . . Convention of the Audio Engineering Society, Ambassador Hotel, Los Angeles.

April 12 . . . N.Y. Chapter, SMPTE, meeting at World Affairs Center Auditorium, U.N. Plaza, N.Y.C.

April 15 . . . First Annual Convention of the Intermountain Professional Photographers Association, Salt Lake City.

April 15-18 . . . Rocky Mountain Photographers Association meeting, Denver.

April 19-22 . . . American Film Festival, Barbizon-Plaza, New York City.

April 21-22 . . . Religious Education Committee meeting of the Audio-Visual Council of Public Information, Deauville Hotel, Miami Beach.

April 23-27 . . . Gathering of the Dept. of Audio-Visual Instruction of the National Education Assoc., Miami Beach.

April 26-29 . . . Fifth Annual Photojournalism Conference of the ASMP, University of Miami, Coral Gables, Fla.

May 3 . . . N.Y. Chapter, SPSE, meeting at Western Union Aud., 60 Hudson St., NYC., 8 p.m. "Advances In Photographic Chemistry," talk by George B. Eaton of Kodak Laboratories.

May 7-12 . . . SMPTE semi-annual convention and equipment exhibit, Toronto, King Edward Hotel.

May 22-26 . . . SPSE annual conference, Arlington Hotel, Binghamton, N.Y.

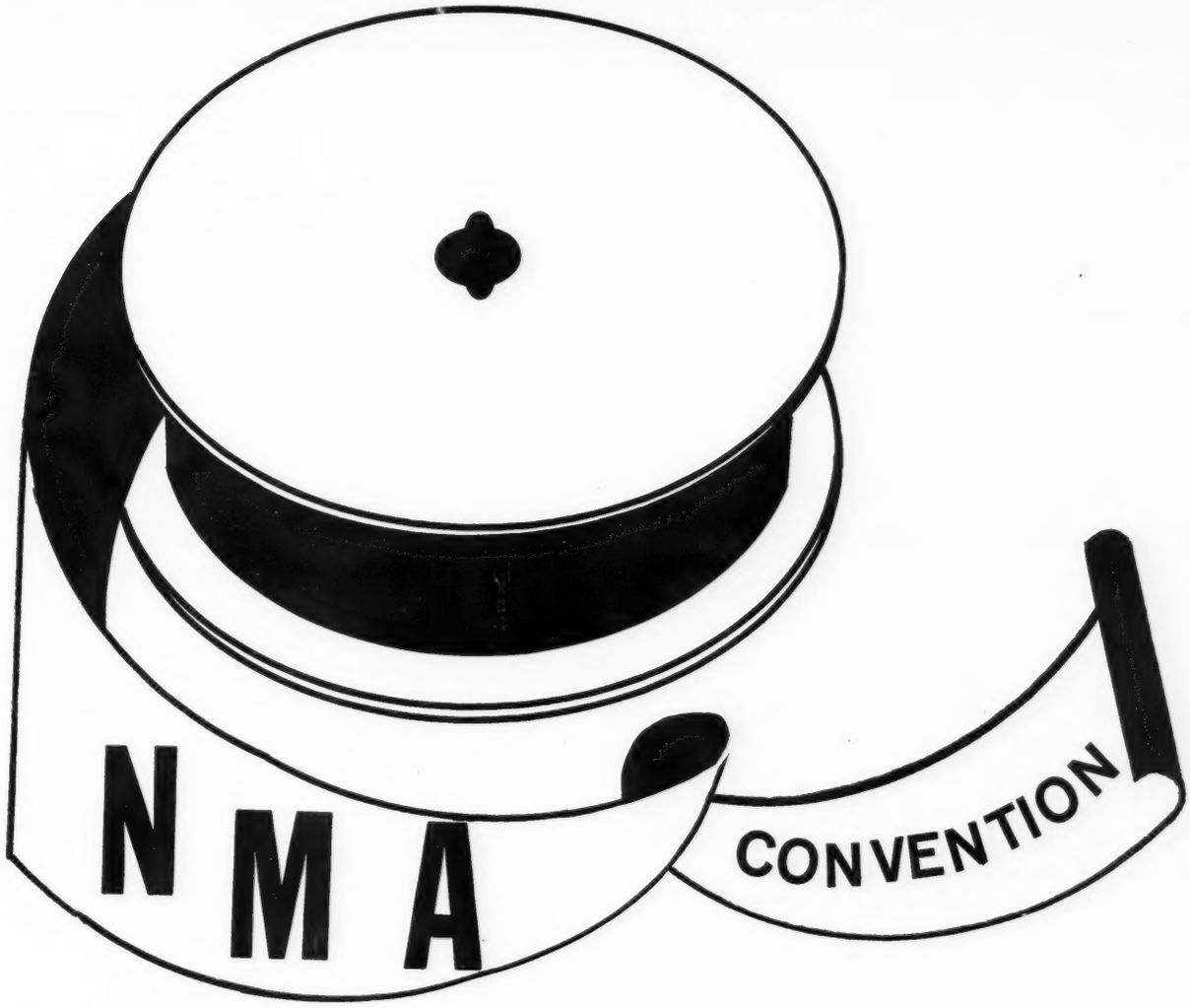
May 23-24 . . . NVPA Day of Visuals, Hotel Roosevelt, N.Y.C.

June 2-3 . . . AMC Caravan, Hotel Miramar, Santa Monica, Calif.

June 2-3 . . . Industry Film Producers Association annual convention, Santa Monica, Calif.

Regular Meetings

Rochester chapter, SPSE, meets on the second thursday of each month . . . Industry Film Producers Association, *Los Angeles chapter,* meets the first wednesday of each month . . . Southern California Industrial Photographers gather every third tuesday . . . Industrial Photographers of America *(N.Y.-N.J.)* meet the second and fourth thursday . . . Rocky Mountain Industrial Photographers gather every fourth monday in Denver . . . National Visual Presentation Association convenes every second thursday in New York . . . *New York chapters,* SPSE, SPIE, SMPTE and SRE meet on the first wednesday, third thursday, second wednesday and first monday respectively . . . *Binghamton chapter,* SPSE comes together every third thursday, while S. California SPSE meets last monday and Cleveland SPSE meets first tuesday . . . Association of Federal Photographers has meetings every third Wednesday.



Microfilm Men Come to Town

"The Impact of Science and Technology Systems" is the title of Keynoter Richard S. Leghorn's address which will open this year's National Microfilm Association convention being held April 4-6 at Chicago's Sherman Hotel. Leghorn, who heads the ITEK Corp., is a leading spokesman for this new field and an authority on the solving of modern information-handling problems.

A Colonel in the USAF Reserve, he has had 20 years of broad military and industrial experience in executive management, marketing, research and development. As chairman of the National Planning Association Committee on Security through Arms Control and while holding other government jobs his specialty has been data handling in the technical area.

Leghorn's keynote address will kick off three days of talks and panel discussions by experts and technicians in all fields of microreproduction. These talks, plus the more than 100 exhibits of the newest in microfilm equipment, are expected to draw an attendance of more than 1200 at the convention.

A tentative schedule is as follows:

Monday, April 3

Convention and exhibit set-up.

Tuesday

12 Noon — Luncheon with welcoming address by Frederic Luther, NMA president. Keynote speech.

2-5 p.m. — Session I, Microfilm Logistics. Chairman, Eugene Power, University Microfilms.

2 p.m. — The Place for Microfilm in Records Management Program. John Caton, Illinois State Records Advisor.

2:30 p.m. — How to Conduct a Feasibility Study. William P. Burleigh, Jr., Microsurance, Inc.

3 p.m. — The Economics of Microfilming: A Comparison between Contractual Services and a Do-It-Yourself Program, Frederic Luther, Frederic Luther Co.

3:45 p.m. — Panel discussion composed of speakers.

Wednesday

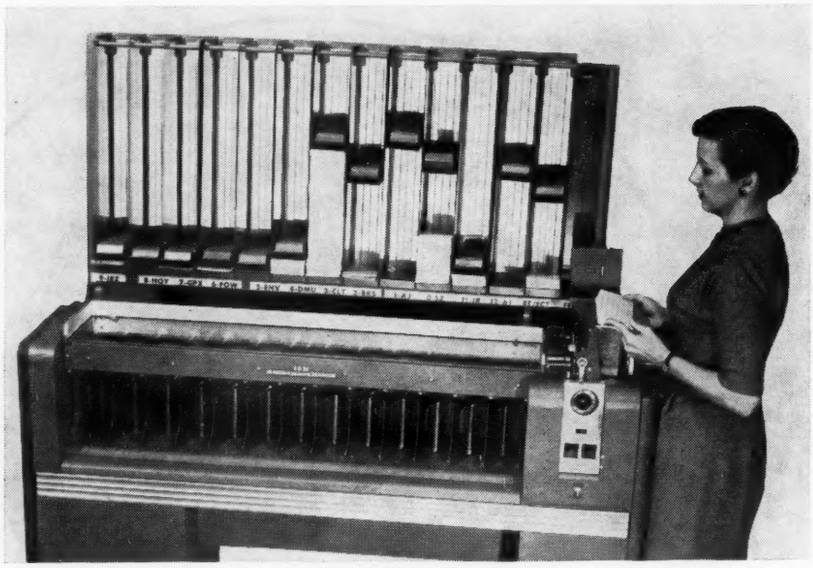
9-12 a.m. — Session II, Engineering Applications. Chairman, Hugh W. States, Micrographic, Inc.

9 a.m. — Activity on the West Coast. Mr. States.

9:15 a.m. — Short Cuts to Automation. George T. McMahon,

continued on page 67

Naval engineers find that a winning combination of microfilm and EAM cards means instant accessibility of all drawings.



LILLIAN ULLRICH uses IBM card sorter for distribution of Filmsort cards prior to mounting.

Specs At Their Fingertips

The Filmsort card concept for the reproduction, storage and retrieval of engineering drawings is being successfully applied to its LVT (Landing Vehicle, Tracked) program by the Navy's Bureau of Ships.

Filmsort cards are used as a means of distributing drawings on unitized microfilm. Hard copies can be reproduced from the unitized microfilm by the electrostatic dry process.

The cards are accomplished in five phases as follows: (1) microfilming of the drawings, (2) processing of the microfilm, (3) punching and interpreting data in the aperture cards, (4) mounting microfilm in the aperture cards and (5) inspecting and distributing sets of unitized microfilm aperture cards.

DENSITY READING is checked by Sue Bloomquist before photographing LVT drawing.

Duplicating Microfilm

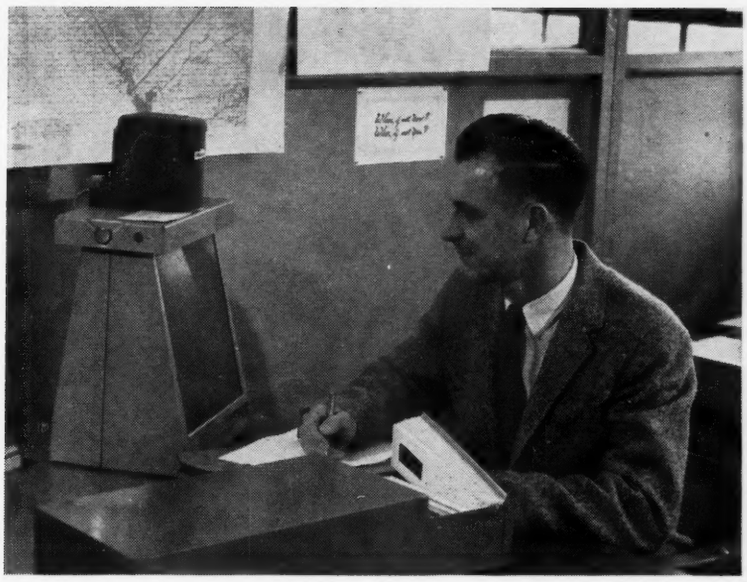
Microfilming of LVT drawings was accomplished at the design agent's plant (the Ingersoll Kalamazoo Division, Borg-Warner Corp.) under the supervision of the Recordak Corporation, in accordance with government specifications. With 15 sets of Filmsort cards required for distribution to all activities concerned with the LVT program, the problem of duplicating the sets of microfilm was explored.

To maintain a high standard of quality, it was decided to provide all activities with first generation microfilm. This was accomplished by attaching a Recordak Multiple Exposure Counter to the microfilm camera so that by setting the counter and pressing a release button the drawing is photographed as many times as may be required.

The rolls of exposed microfilm were put through a rigidly controlled processing system, where each roll was carefully processed and inspected for adherence to specifications with respect to reduction ratio, resolution, background density and other controlling factors. While the rolls of microfilm were being processed, a master set of electric accounting machine cards were being key punched and interpreted with the drawing title, drawing number, revision letter and date, security classification and distribution code. The information for each card was obtained from work sheets that had been prepared by the camera operator during the period the drawing was being photographed 15 times.

Run Through Interpreter

The cards were then run through a tabulating interpreter, which printed the previously punched data across the top of each card. Each master card was then verified by double-checking it against the microfilm images. The master cards were then run through an IBM Reproducer to produce the 15 sets of punched aperture cards required. The final step before distribution



PROJECT ENGINEER Dan Smith uses easy-to-operate tabletop reader for viewing LVT engineering drawings.

AL COMER, another project engineer, with about 30,000 LVT drawings at his fingertips.

was the mounting of the microfilm frames into their respective cards. Each roll of film was passed through a semi-automatic mounter, and the images were matched and mounted to their particular cards by the operator.

To keep the LVT Filmsort program up-to-date, new drawings and revisions to old drawings will be microfilmed and mounted in aperture cards and furnished to LVT activities on a continuing basis. Thus, all sets of Filmsort cards will be kept current with the master set maintained by the LVT design agent. This will contribute to a continual program of reduced cost, improved quality, faster service and less required filing space.

Numerical Filing

Valuable engineering time is saved in this program by providing a compact system in which microfilm copies of all drawings and revisions thereto are filed in numerical sequence. Due to less demand for reference and reproduction, the original drawings can now be safely filed and protected against loss and abuse, thereby materially reducing drafting time formerly spent on redrawing. The revision procedure is simplified by altering the original drawing only and creating, in turn, a superseded file of unitized microfilm images. These are filed in ascending numerical order behind the microfilm of the original drawing.

No Full-Size Reproducibles

Appreciable savings in operational costs are realized by eliminating the need for full-size paper or cloth reproducibles. The Filmsort method allows the unitized microfilm to act as a master reproducible. The image can be enlarged photographically or electrostatically to full or reduced-size vellums, offset masters or sulfite paper prints. Reference and storage print requirements are reduced 90 per cent through the use of the microfilm mounted in aperture cards.

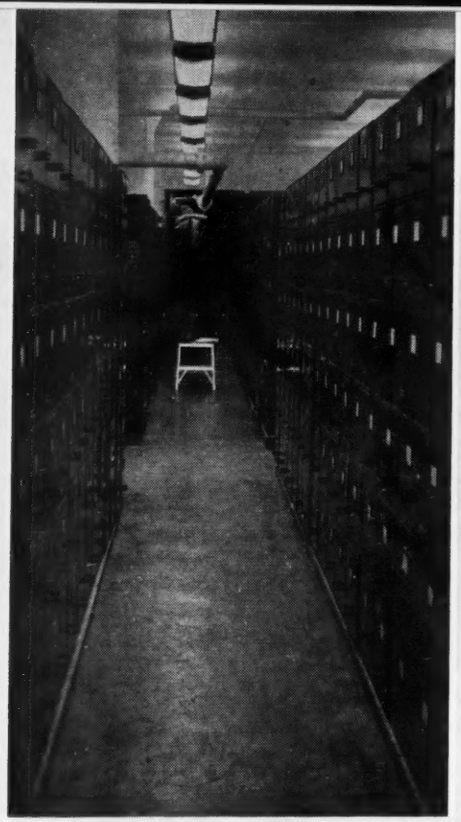
The method outlined provides fingertip accessibility to all LVT engineering drawings. The engineer who needs to refer to a drawing has only to select the Filmsort card from the aperture card file and insert the card in a Filmsort Viewer, which projects the drawing image on the viewing screen. Should the engineer require a print for more extensive reference, a reproduction of the drawing can be made by the Bruning Copytron 1000 Microfilm Enlarger-Printer in less than 30 seconds. Since these prints are inexpensive, they are disposed of after use, eliminating any need for a print file.

Faster Dissemination

The creation of this compact and unitized microfilm file allows for faster handling and shipping of drawings for dissemination to the field, with an attendant saving in preparation and mailing costs.

For some time, other phases of military programs have, wherever possible, used electric accounting machine card processing. The Filmsort card fits into the over-all system and serves as a good basis for such additional EAM requirements as the Engineering Release, Provisioning, Stock Control and Cross Reference.

The Bureau of Ships has established a rather complete equipment program wherein EAM cards are used extensively, although not exclusively. In practice, the design as depicted in the Filmsort card is released by an EAM card. This release card and the Filmsort drawing together serve for preparation of a Provisioning List consisting of a set of four EAM cards. Due to the practice of assigning various manufacturers' numbers to the same item, an EAM Cross Reference deck has also been established. □



BEFORE: Back letters at EK used to be stored in ceiling-high file cabinets. Although system was efficient, labor costs for retrieval were expensive.

FLOOR SPACE required under old set-up was astronomical. New system, which uses microfilm and punch cards, has reduced annual expense of operating files by about 30 per cent.

File COntrol With

by **ROBERT E. O'NEILL**
Department Head
Communications and Record Services
Eastman Kodak Company

Eastman Kodak Company, one of the leading photographic concerns in the world, has turned to photography and combined it with the latest advances in automation to handle active correspondence files. The old system — though relatively efficient — was bulky and required a good deal of floor space, filing equipment and time. The new procedure has reduced the annual expense of operating correspondence files by about 30 per cent.

The new system has been made possible because of recent developments in microfilming equipment. These include automatic indexing which automates look-ups, film magazines which have eliminated time-consuming threading in viewers, and inexpensive printing equipment, making it possible, in less than a minute, to obtain full-size paper copies from an exposure on the microfilm.

How does the new system work?

A unique blending of microfilm and EAM cards provide a simple and effective method of filing this correspondence and also allows for locating the documents desired with a minimum of time and effort.

Tab cards are prepared in advance, sequentially numbered from 1 to 3000 to correspond with the approximate number of images on a 100 foot roll of microfilm. Each batch of these cards also contains a common roll number which is gan punched into the cards. These are prepared by the Tabulating Department, at their convenience and they must remain a few groups of cards ahead of the file section.

Results That Count

File Control at EK means (1) 30% yearly savings on file operations, (2) 45% yearly reduction in expenditures for cabinets, and (3) easier retrieval of material.

WITH printer able to produce copies in less-than-a minute a copy is made by exposing sensitized paper.

WHEN CORRESPONDENCE is received at Communication and Record Services Dept., a stamp is used to indicate the name under which it is to be filed.

KEY PUNCH operator punches and interprets the first five letters and first initial of the code together with the date of the correspondence.

Microfilm

With the assistance of Recordak Corporation, the Kodak subsidiary in the microfilm and business systems field, the Communication and Record Services Department at Kodak blended the time and space-saving features of microfilm with the convenience of EAM cards.

Letter Scanned By Clerk

Correspondence, as it arrives in this department, is scanned by the indexing clerk. The name (addressee or addressor) is denoted by the placement of a rubber stamp with a finger-type arrow. Bundles of the marked correspondence arrive at the keypunch machine together with the batch of EAM cards for the roll of film currently in use. The operator keypunches the first five letters of the name under which the correspondence is to be filed, together with the first initial and the date of the correspondence.

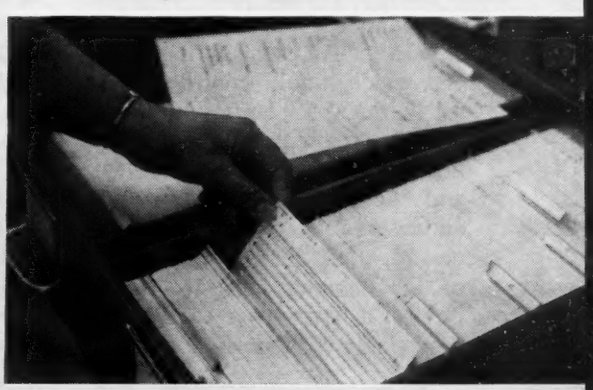
This information is interpreted on the card at the same time. She drops the correspondence in the Reliant Microfilmer which is located at her left elbow, and continues this operation for each piece of correspondence. When the sequence number of the card

continued on page 68

DOCUMENTS are then filmed in sequence on Reliant microfilmer with knobs at right used to show sequence every ten numbers on the film.

LEFT, roll in magazine is placed in Recordak Lodestar reader. By watching Kodamatic lines operator quickly locates proper document.

RIGHT, using EAM cards as index, desired roll and sequence number can be gotten manually or with tab equipment.



MICROFILM ROUNDTABLE

A panel of microrecording experts answer your queries about making, retrieving and using microfilm in all its many forms.

As it has in the past with color photography and motion pictures, INDUSTRIAL PHOTOGRAPHY has called together a panel of experts to answer questions frequently asked by our readers. This time the subject is microrecording. Hubbard Ballou, of the Columbia University Library and a frequent contributor to IP, helped organize the session. Pictures and brief biographies of the panelists appear on this and following pages.

Q. It has been suggested that the National Microfilm Association set up a Microfilm Consumers Information Bureau. Do you think this would be a good idea?

Hutchinson: Such a bureau is practically a necessity.

Clapp: I think this would be a good idea.

Welch: An excellent idea, and one which would contribute directly to NMA's purpose of "providing a channel of communication for producers of equipment and supplies, service companies and users." It could serve as a clearinghouse for technical information. Such a bureau might publish a news sheet at intervals reporting questions and answers of general interest.

Q. Have you ever run into a situation where irreplaceable microfilm records appear to be extremely damaged? If you have, how did you handle it? What methods of retrieval have you come across that I might keep in mind for a "disaster" situation?

All agreed that prevention is the best cure and urged careful attention to safe storage facilities. Dick Hale and Frank Bobb however, did offer some reclamation advice.

Bobb: Rolls containing microfilms stuck together can be separated by completely immersing and soaking them in cool water; then slowly and carefully unrolling them. Damaged microfilms should be repaired by experts; then duplicated so as to preserve the filmed record.

Hale: The only method of cure is to have clear and simple instructions as to the proper drying and restoration of microfilm and to see to it that there are plenty of copies of these instructions available in many places. This should prevent well-intentioned rescue workers from doing irretrievable damage.

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FRANK W. BOBB is Records Analyst in the Philadelphia Department of Records. In 1938 he was awarded the Rockefeller Foundation Fellowship in Microphotography.

RICHARD W. HALE, JR. is the Archivist of The Commonwealth of Massachusetts. He was Editor of the Guide to Photocopied Historical Materials from 1957 to 1960.

SIMPLE AS A·B·C
A. Operator inserts microfilm aperture card.
B. Next, inserts sheet of ordinary paper, vellum, or offset paper master. Insertion starts automatic printing and processing cycle.
C. First print is automatically delivered in 30 seconds; subsequent prints (of the same or different drawings) every 15 seconds.

From microfilm to an 18"x24" print ...in seconds and on ordinary paper!

You can have a dry, positive, 18"x24" engineering print in seconds and on ordinary paper with the new XeroX® Copyflo® 1824 printer.

This remarkable machine, which requires no exposure settings or other adjustments, reproduces from a microfilm aperture card, making 18"x24" prints—or smaller—at extremely low cost. It also copies onto vellum or offset paper masters.

Operation is automatic. Prints ready for immediate use emerge as fast as four a minute.

The quality of reproduction is superb. Images are sharp black-on-white and won't rub off. There is no odor, no waste, and the finished print may be written on with pen or pencil.

Regardless of your engineering-drawing-reproduction needs, you can now enjoy the tremendous savings in time, money, space, and materials of your own unitized microfilm system.

Formerly, such economies required a substantial reproduction need. Today, however, the Copyflo 1824 printer offers the same proportionate benefit to small-volume users as to large. No need now for vast files of engineering drawings. Microfilm aperture cards require only a fraction of the storage space required for other reproducibles. No more costly waiting for prints, which—made by a Copyflo 1824 printer—are so inexpensive your engineers can discard them after use.

Write today for our free 1824 booklet giving the full benefits you can expect from a Copyflo 1824 printer. HALOID XEROX INC., Dept. 61-355X, Rochester 3, N. Y. Branch offices in principal U. S. and Canadian cities. Overseas: Rank-Xerox Ltd., London.

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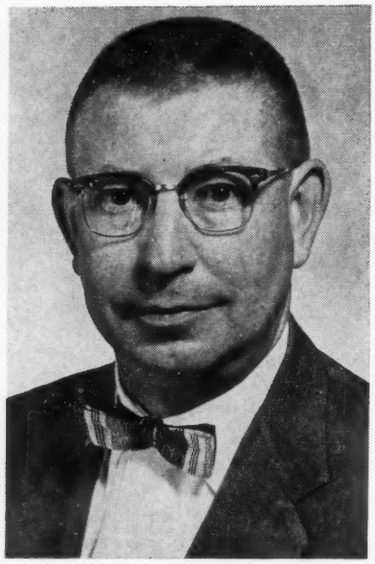

GEORGE H. HAMP is in the Navy Management Office of the Executive Office of the Secretary of the Navy as staff consultant on microfilm systems.

MICROFILM ROUNDTABLE

continued from page 26

Q. Would you care to comment on the applications and problems of color microfilming?

Jewell: We have used color film for approximately five years. Fine resolution is difficult to obtain, but for distinguishing color on accounting records and for color in coded maps, color film serves a satisfactory purpose in our operations. No mechanical changes were necessary in any of our equipment.

Hamp: The need to microfilm in color is limited. Our tests indicated that technical deficiencies in color emulsions (resolution, primarily) plus film and print costs could not justify the limited need for color encountered in some of our engineering drawings and technical manuals. Our tests on maps and charts, which do offer a good potential for color microfilming, in fact for a film chart system, indicate the need for considerable technical improvements.

Q. Will microfilm ever replace full-size photocopy entirely? Should it be expected to do so? What particular advantages (or disadvantages) would full-time microfilming have over photocopy?

Hutchinson: The Armed Forces Supply Support Center has assigned to the Air Force, Air Material Command, an engineering practices study entitled "Use of Microfilmed Engineering Documentation Records in lieu of Original Documents Prepared by Design Activities." Already the Air Force has adopted microfilmed data in the form of aperture cards, when available, as the official record document.

The trend appears to be to operate from microfilm originals and reproduce to half-size copy. Some disadvantages in employing such reduced-size copy continue to exist, notably the legibility of note, figures and symbols. Efforts are being made to adjust drafting standards where feasible to improve line, figure, letter, symbol, etc., rendition on tracings. Improved micro-reproduction processes are needed, however, to fully satisfy all military legibility requirements. Production drawings, especially, require good legibility to prevent errors. For that purpose, full-size photocopy remains the primary method so far.

Clapp: In my opinion, microfilm will replace full-size photocopy for many purposes, and the extent to which it will replace it will be in proportion as microfilm can be conveniently used. The availability of an adequate hand reader obviously plays an important part in this development.

Welch: Of course not. Microfilm will not meet the needs in certain cases, e.g., hard-to-read manuscripts.

Weber: No, it could never be expected to do so.

Sophar: In many cases, yes. A good example of this is the use made of Microcards for the dissemination of meteorological data during the International Geophysical Year.

Rosse: As far as I am concerned, microfilm has already replaced full-size photocopy in at least 90% of our daily requirements.

Hale: Microfilm will not replace full-size photocopy, but it will be the master negative from which more and more full-size photocopy is made.

Carruthers: Experience at the New York Public Library over 25 years has shown that microfilm has not appreciably cut into the field of extract copying.

Q. Where do you house your readers? Why did you settle on this system? How are they serviced?

Weber: Most readers in the Harvard Library are in a specially designed Microtext Reading Room. A few are located in special collections, and a few are available for loan to faculty. This arrangement was adopted to achieve close proximity to the main research collection, because of the advantages of centralization for maintenance service on readers, in order that an expert could advise on use of film, to provide adequate physical care for the film collection and to offer a convenient splicing service.

Jewell: All of our readers are housed in the Microfilm Department immediately adjacent to our film processors. They are so located for two reasons: (1) the employees who operate the read-

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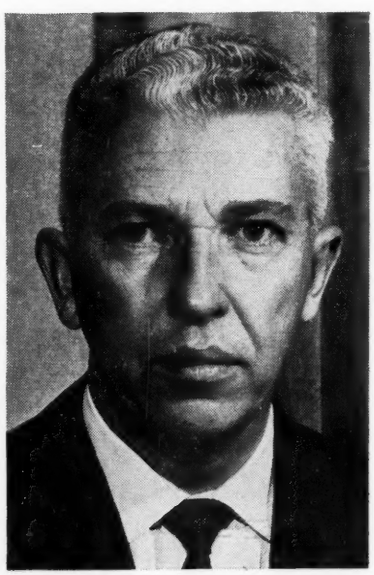
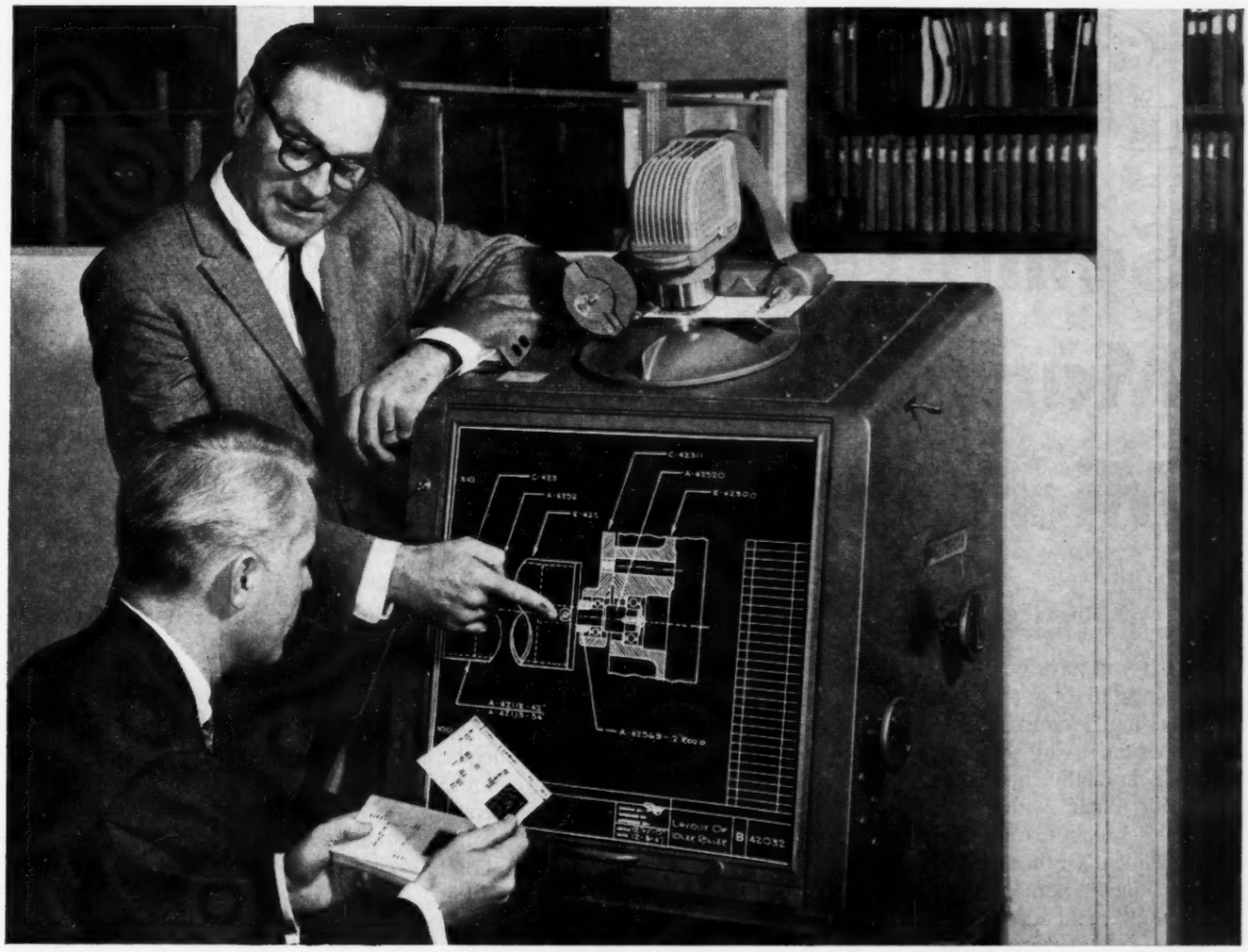


WILLIAM S. HUTCHINSON is Assistant Chief, Mechanical and Engineering Programs Branch, Standardization Division, Armed Forces Supply Support Center.



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There's more to these RECORDAK pictures than meets the eye!

RECORDAK precision 35mm microfilm images *more than meet DOD requirements*—give a minimum of 120 lines per mm resolution at 30-to-1 reduction ratio.

Look closely at some RECORDAK microfilm images in a film reader. See how every detail is sharp and clear . . . how the backgrounds are remarkably uniform, even though the pictures you're looking at were made from drawings and prints of every type and age.

How do these RECORDAK pictures come out so well?

First, the negatives are made on RECORDAK Micro-File Film with RECORDAK Precision Microfilming equipment. Carefully controlled exposure techniques assure uniform backgrounds and contrast. The exposed film then is developed, according to the most up-to-date scientific standards.

Your staff can easily be trained in the use of RECORDAK Micro-File equipment especially calibrated to produce images which meet DOD requirements.

This is important, for your success with an automated engineering drawing program depends *mainly* on the quality of the pictures you use, and on the quality of the prints you can make from them.

Free booklet goes into more details on precision microfilming available through Recordak or a Microfilming Dealer of Recordak.

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originator of modern microfilming

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Selling Your Management Microfilming

Ten common-sense guides to consider when proposing a microfilm system to brass that may make your selling job easier and effective.

by ROBERT C. COOLIDGE

If you have been bitten by the microfilm bug (perhaps through reading IP) and can imagine your division saving thousands of dollars annually, don't jump out of your chair with a handful of sales brochures and head for the president's office.

Ninety percent of all good management ideas fail to mature because the person who acquires the system proposal has less chance to imagine the results than the person proposing the idea. Convincing your company to install a microfilm system requires an imaginative presentation, a presentation that allows management to perceive your selling story the way you want it understood. If you follow these simple guides your proposal will become more readily understood, the mental image you wish to create will become clearer, and the chances of management's continued interest in your program will be greatly increased.

1. *Obtain permission to research your system.* Any progressive company will welcome ideas that may result in dollar savings or better business service. Management's approval will be your most powerful tool in obtaining the necessary information needed for an intelligent systems proposal.

2. *Determine what you wish to accomplish.* If you are aware of the problems, you will ascertain solutions more readily. You will realize the point of accomlishment once you reach it.

3. *Research your paper problems.* Your division might not be the only department that will find a microfilm system advantageous. See how your business is "doing it now" and if information on film will adapt itself elsewhere within the company.

4. *Request the aid of other departments.* You will obtain cost analysis, flow diagrams and other pertinent data. For this information you must go to the purchasing department or to various staff personnel outside of your own group. If you interest other departments in your research, you will have a small army of semi-silent observers behind you. This creates cooperation and keeps interest alive until your proposal is completed and brought before management.

5. *Enlist the aid of a microfilm service company.* Any microfilm service company will be happy to advise you and supply information about filming equipment, service costs and advantages or disadvantages of specific microfilm programs. Most service organizations will gladly run sample film of your business records and recommend various approaches to your problems. They will also advise you of other companies of like endeavor that are using microfilm.

6. *Don't sell the system before you have the facts.* You may find that the system you have in mind should pay for itself in "X" months or years. This might justify such a change when you consider dollars alone, but in industry, other tangibles will be examined, such as organizational changes and manpower techniques.

7. *Report the disadvantages as well as the advantages.* In every system there are inherent weaknesses. A microfilm program is no exception. Nothing will cause management to loose interest faster than a disadvantage you neglect to mention in your proposal.

8. *Use graphic illustrations and work samples.* You are now ready to present your ideas to management. The use of simple graphs and visual aids have two advantages. One, it will create a clearer and more interesting picture to those persons studying your proposal and, two, it will give the appearance of knowledge or authority on your part.

9. *Bring management together for the presentation of your systems proposal.* When you meet with management, have a microfilm service company representative at your side. If a question is asked of you which you are unable to answer, you will have a qualified man in the room to help. Describe the problems you

continued on page 50

How professional should a camera be?

How much camera should a pro invest in?

First, it depends on the features he needs. If he's like most pros he can't begin to itemize the hundreds of different types of jobs he handles—everything from portraits to microphotography. In the long run he might wind up buying half a dozen "specialized" cameras to fill his requirements.

The single lens reflex Hasselblad eliminates this. With *one camera*, plus interchangeable accessories, you can get over 100 combinations, and set up in seconds for practically every shot known to photography. Four different lenses, three film magazine sizes plus a sheet film holder, four types of viewers—everything changes. The Hasselblad makes it absolutely needless to carry more than one camera on an assignment.

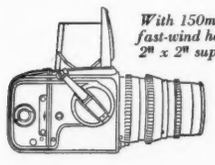
Next, a pro wants quality. How much? Enough to guarantee him perfect results under any circumstances. After all, his living depends on it.

Take the Hasselblad lenses. No scrimping on quality here! Each one is made by Carl Zeiss and has its own Synchro-Compur shutter and automatic diaphragm. Resolving powers permit greater enlargements than virtually any other lens made. For studio work, *color and detail is up to the best you ever got.*

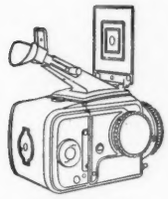
The precision single lens reflex system, of course, completely eliminates parallax. Focus and depth of field appear on the print-size ground glass just as the film will take them. A pop-up magnifier allows you to focus accurately on minute details. There are no surprises waiting for you in the darkroom with a Hasselblad.

Even the ***"conveniences" on the Hasselblad***, the EVS system, automatic diaphragms (which can also be set manually), and automatic safety devices are to make assignments easier and free you to concentrate on the job. When you use an instrument every day, you have a little convenience coming to you.

How professional should a camera be? As professional as a Hasselblad, *no less.* With Zeiss Planar 80mm f/2.8 lens, $549.50, including F.E.T. Write Dept. **HIP-4** for literature and the name of your nearest Hasselblad dealer. PAILLARD Incorporated, 100 Sixth Ave., New York 13, New York.



With 150mm lens, fast-wind handle, 2" x 2" superslide back

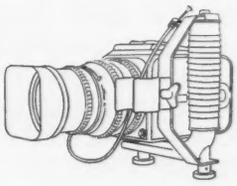


With prismatic sports finder

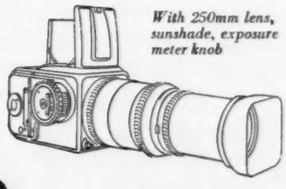
With magnifying hood, 60mm lens, back for 16 1⅝" x 2¼" exposures, exposure meter knob

With sports finder, camera grip, 80mm lens

With magnifying hood, cut film adaptor and holder



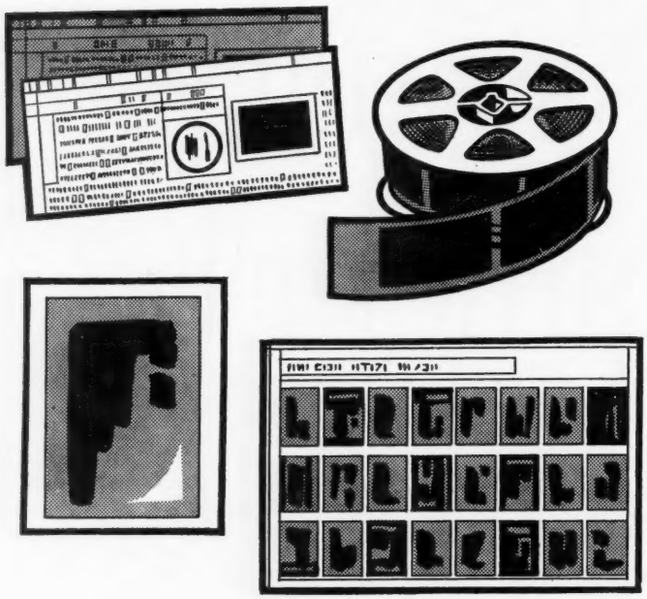
With 150mm lens, sunshade, flash gun bracket, back for 12 2¼" x 2¼" exposures



With 250mm lens, sunshade, exposure meter knob

HASSELBLAD

Circle No. 570 on Post Card



"You Can So Find It"

Whether it's in a roll, aperture card, jacket or microfiche, microfilm can be easily retrieved.

by ROBERT P. BERNER

One of the objections to microfilm voiced by some in records management circles is that "you can't find it on microfilm." This isn't so.

There are four microfilm tools: roll microfilm, aperture cards, jackets and microfiche. Each one has its special requirements for indexing. If these requirements are recognized and understood, there should be no retrieval problems.

Roll Film

Let's look at roll film. Roll film is our most economical microfilm format. It is also one of our most flexible ones. A roll film file should be used, unless we have to make additions or revisions to the record.

In roll film indexing, the most logical grouping is chronological, such as one day's checks, one day's cycle billing, one year of correspondence. The next most logical grouping is numerical. You even can operate a roll film file with missing numbers in the numerical sequence. When you do, just remember you need a locater for every purpose.

Roll film is not properly used when records are in incorrect sequence before they are filmed, when procedures call for changes to the record itself, changes to the record sequence, or additions to the record. Roll film may be cumbersome to use when information is scattered over many rolls of film. Actually, a good roll film file should be just as efficient — if not more so — than the original paper file.

Aperture Cards

Let's look next at aperture cards. It is wrong to say that aperture cards are better than roll film. Aperture cards are properly used to make records uniform, to make possible changes to the records themselves, changes to the file sequence, addition or revisions to the file.

When you are indexing aperture cards, you arrange your input for ease of camera operation. After the film is mounted in the cards, then is the time to sort them into desired file sequence.

Here is a major fundamental difference between roll film and aperture cards. Roll film input must be in file sequence before it is microfilmed. Aperture card input is arranged for ease of filming. This is because many aperture card operations have the ability to make records of varying size, shapes and materials uniform.

Jacket cards are used for one location filing. A jacket is a file folder in film. There are some file folders manufactured where jackets of the previous information are housed in the new folder. A major reason for a jacket file is the necessity to add information to the jacket.

Obviously, when you are microfilming for jackets, it is good practice to have the papers for each individual jacket in proper sequence. It is not absolutely necessary to have the different sets of jackets in sequence, although it helps.

Microfiche

Microfiche has a major advantage over jackets. It is a very handy microfilm format for multiple file distribution. Like jackets, material for each microfiche should be in file order before being filmed, but the sets of microfiche do not need to be in order before being filmed.

Your ability to use microfilm as a tool for retrieval depends upon your knowledge of these four film formats and their requirements for indexing before the first piece of paper is placed under the camera lens. Become familiar with them. □

Official U. S. Navy Photograph

Even Antarctic Weather Can't Stop SUPER SPEED GRAPHIC* and GRAFLITE*

Super Speed Graphics have been performing dependable photographic service for Operation Deepfreeze in Antarctica. In the photo above, for instance, Ensign C. J. Haggerty is shown photographing operations of the Navy's C-130 ski-equipped, 4-engine, turbo-prop, heavy duty transports. The photo illustrates the difficulties encountered in subzero photography . . . and why camera, shutter and flash must operate consistently and conveniently in spite of cold, blizzards and heavy, cold weather clothing.

The Graflex* 1000 Shutter is made-to-order for cold weather service. Its orbital-acting blades which eliminate damaging bounce or shock, have fewer parts for trouble-free, dependable operation. All adjusting levers are widely spaced, easy to actuate even with gloves on. So is the big, easy-to-grasp combination lenshade and shutter winding ring. These features have made Super Speed Graphic cameras equally dependable in antarctic cold, tropic heat, fire, flood or hurricane . . . wherever or whenever there are pictures to be taken.

*TRADE MARK

For full information on the Super Speed Graphic with Graflex 1000 Shutter and other Graflex-made equipment, see your Graflex dealer. Or, write Dept. PP-00, Graflex, Inc., Rochester 3, N. Y. In Canada: Graflex of Canada Limited, 47 Simcoe Street, Toronto 1, Ontario.

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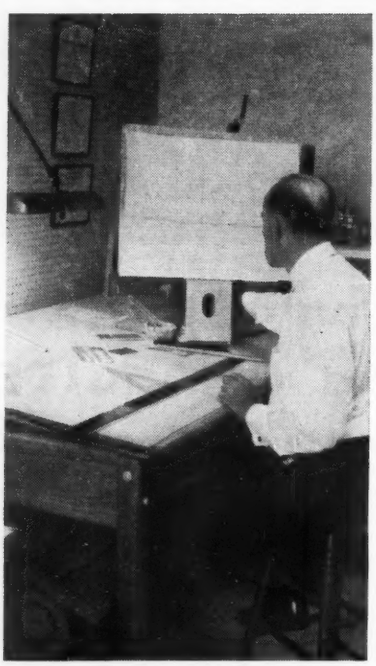
Architect Shrinks Business Problems

This enterprising businessman's clients benefit from the combination of artistry and modern science.



ABOVE, a client in need of reassurance gets a review of selected projects on microfilm. BELOW, draftsman makes quick reference to drawing at his work area in quick, easy fashion.

by MORTON Z. LEVINE, A.I.A.

Even the architect — an artist concerned with creating attractive buildings — finds that he must employ modern, down-to-earth office procedures if he is to be a success at his craft. Blueprints and other data are his most precious tool. Because of their irreplaceable nature they must be preserved in a disaster-proof container. In addition, they must be housed compactly in a quickly accessible system.

Fire Would Be Disaster

Unfortunately my handling of blueprints fell short in all these areas. Full scale prints of all my work were filed in mammoth drawers stacked ten high. If fire, flood or burglary struck my office these cabinets provided little protection. In addition, the facilities took up a sizable chunk of office space and the drawings were becoming tattered from handling.

I suspected microfilming might solve my problem and called up Western Blue Print of Chicago for advice on miniaturizing my drawings. A representative called on me and outlined a plausible procedure for reducing my drawings to microfilm.

Western was given the contract to microfilm all drawings on 35mm microfilm in 100-foot rolls. These are placed in my bank vault for safekeeping.

From these frames full scale duplicates (often superior to the original drawings) can be produced on film when needed. I can make erasures and changes on this reproduction and get as many blueprints from it as necessary.

In addition to the rolls stored away I have two sets of these drawings mounted on aperture cards and filed in compact desk-top metal cabinets. Keypunched information plus the drawing title, commission number, page number and date are imprinted on the card.

The first set is in the drafting room. Draftsmen can pull a card and carry it to the drawing table where a viewer makes reference easy.

Full-Scale Enlargements

The second set of drawings is in the conference room and close by is another type of viewer with a portable 18 x 24-inch screen. The viewer is capable of projecting an unlimited size enlargement on the wall. When a client makes his first visit I no longer reach for bulky prints of previous projects. Instead, I pick up a deck of aperture cards, turn to my viewer and the client is given a graphic idea of my previous work.

Aperture Cards

I have even gone one step further. When I complete a project I shoot transparencies and mount these on aperture cards also for subsequent projection in the viewer. Thus the client sees my work displayed in still another medium.

Microfilm has helped cut mailing costs. For long distance projects where the mailing of hundreds of blueprints would be time consuming and costly I enclose aperture cards in an envelope and send them air mail at a fraction of the cost.

I now have a drawing reproduction system tailor-made to my needs and at a cost I can afford. □

A superb new single lens reflex camera!

The new Heiland Pentax H-3 is classic in design—meticulously constructed—completely functional. It has a host of exciting new features, yet it's identical to the famous Pentax H-2 in compact size and light weight. The H-3's new fast lens, fully automatic diaphragm and wide range of shutter speeds give you complete control over every picture situation—a new confidence which makes every picture better than the last.

HEILAND PENTAX H-3

with fully automatic diaphragm, f/1.8 lens, 1/1000 sec. shutter

New! Ultra-fast Auto-Takumar 55mm f/1.8 lens. Fully coated and corrected; detent action f/stops.

New! Instant-open fully automatic diaphragm. Automatically stops down to preselected aperture; then opens fully a moment after exposure.

New! Diaphragm preview lever operates with a flick of your finger; allows you to visually check depth of field before exposure.

New! Focal plan shutter with speeds from 1 to 1/1000 sec., plus Time and Bulb, on single dial.

New! Advanced Fresnel lens design for the most positive focusing you've ever experienced.

Plus—Pentax-invented instant return mirror; rapid film advance lever—transports film and cocks shutter; rapid rewind crank; "Cocked" indicator; film type reminder dial; FP & X flash terminals; threaded lens mount for interchangeable lenses.

—And the new Heiland Pentax H-3 with all the above features no more than *$199.50*

A complete selection of lenses

The Pentax H-3 is a complete *system* of photography—for there's a complete line of Pentax accessories and interchangeable lenses, from macro attachments for extreme close-up work to a 1000mm lens that will bring out the smallest features of subjects half a mile away.

Ask your Heiland Pentax dealer for a demonstration of this outstanding camera, or write:

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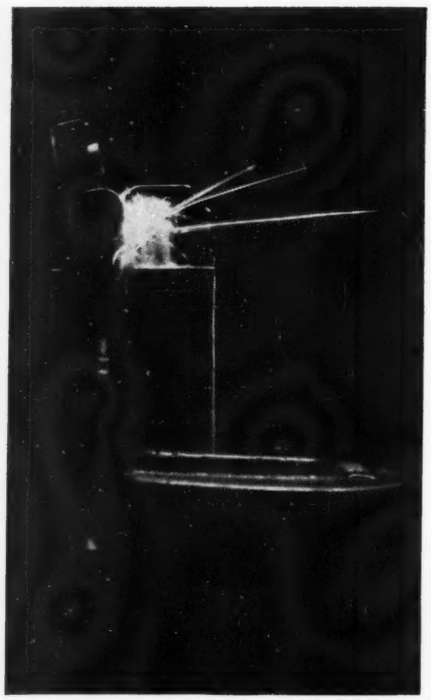

When The Sparks Flew

by JAMES HUGHES
Executive Editor

A contankerous cigarette lighter was no match for photography in the person of a quick-eyed Polaroid camera.

ABOVE AND BELOW: Polaroid prints of a cigarette lighter at work. They are part of the record of tests made to determine why this lighter model was not igniting dependably.

A leading cigarette lighter manufacturer had a problem. One of the models he manufactured was acting cantankerous. It just wouldn't light every time.

He called upon the services of a large industrial design firm to help him solve his problem. They, Walter Dorwin Teague Associates, in turn called upon the services of photography.

Simple But Ingenious

A simple, but ingenious, testing machine was built in the designers' development lab under the direction of Chief Engineer Gordon Peltz. The lighter was worked with its various components in various states. For example, while the wick and wheel remained in the same position, the flint pressure was varied from a half-pound to three pounds, or the wick was moved to different positions. Photography's job was to record the series of tests.

At each step of the testing process, the spark pattern was photographed with a Polaroid Land camera. "No amount of visual or static or theoretical analysis could possibly have done the job," says one of the partners in the lighter firm. "But with the Polaroid Land camera we were able to study the actual spark patterns, then revise our tests accordingly."

The Reason Why

A careful study of the test photographs revealed the reason for the occasional failures: most of the sparks from the flint were hitting the wick tube instead of the wick itself, meaning that the law of averages was working against the wick lighting every time.

The position of the flint tube was changed slightly, so that the wheel hit the flint at a different angle and threw the spark upward. Then photographs were again taken in the laboratory. The new photos showed that with relatively little flint pressure most of the sparks hit the wick rather than bounced off the tube. Photography had triumphed again. □

We'll pay you $50.00 for a picture to fill this space

If it shows how you solved an out-of-the-ordinary lighting problem with G-E Flashbulbs. ■ We want pictures that you couldn't have gotten without flash. Shots that show how flash "saved the day." Light them with G-E Flashbulbs, and if your photograph is accepted the $50.00 is yours. ■ We're interested in spot news, feature shots, studio pictures... every kind from every photographer in all fields. We give a credit line with every photo accepted and claim picture rights for use in G-E professional magazine advertising only. Send yours, with a detailed description of how it was lighted, to: Photo Lamp Dept., No. 282, General Electric Co., Nela Park, Cleveland 12, Ohio.

GENERAL ELECTRIC

Circle No. 534 on Post Card

EDWARD ROSSE has made the Social Security Administration's photographic record system one of the largest in the world. He bears the title of Management Analysis Officer.

MICROFILM ROUNDTABLE

continued from page 28

ers also operate the film processors, and (2) we have in the Microfilm Department space limitations which preclude placing the various microfilm operations in separate rooms or locations. We find this arrangement efficient from the standpoint of saving steps for employees in transporting exposed film to separate locations. The employees who operate the readers perform general cleaning and maintenance. Representatives of the manufacturers are called in for any major repairs.

Q. What can be done about latent image fade? What is its cause and how do you handle it?

Jewell: Latent image fade is presumably caused by a delay between the time film is exposed and subsequently developed, during which time the line resolution of the image fades. Since our film is developed in a matter of hours following exposure, we experience no measurable image fade.

Hamp: One of the best future answers to latent image fade is instantaneous microfilm. If we have available in the future a film that permits exposure development and immediate use, latent image fade will not be a problem.

Bobb: The film should be developed as soon after exposure as possible. Once a developed image has faded, intensification by chemical methods will increase to some degree the negative density.

Hale: Latent image fade can at least be made uniform by scheduling development at a regular interval after exposure and by consistent handling of film between exposure and development. Control of latent image fade can, therefore, be an argument for an institution not only doing its own photography but also its own development.

Q. Do you keep hand viewers around for use by people who don't really need to tie up a reader?

Carruthers: A good hand-viewer would be useful, perhaps, for some part of the cataloger's work and for incidental inspection in the Photographic Service. I do not see that it would be of much use at the reading end.

Clapp: The Council on Library Resources believes that the importance of micro-photography's role would be greatly increased if users could employ microform without the necessity of examining it on expensive, institutionalized equipment, but could employ it casually under the various circumstances of daily living. This argues the necessity for an inexpensive, portable, but satisfactory, hand reader.

Weber: The Harvard Library has found hand viewers adequate for casual inspection involved in acquisition and cataloging.

Welch: We have hand-viewers in the Acquisition, Serials and Catalog Departments, where they are used by those who order, receive and catalog micromaterials.

Sophar: In general, hand viewers are quite convenient and satisfactory for extracting bits of information from a microfilm record.

Jewell: We do not have hand viewers. We have established no policy with respect to low-cost, low-magnification devices. We have a spare, regulation-size reader for use by people outside of the Microfilm Department. This reader is also used during peak times in the regular inspection process in the department.

Q. What can be done about constant voltage? We find the lens will pick up and reflect better than .1 variance of density, and the best available constant voltage transformers are rated at plus or minus 1%, which represents more than one-volt variance.

Rosse: If we preoccupied ourselves less with the theory of density and concerned ourselves more with obtaining legible microcopies, we could successfully operate with one-volt variance inherent in voltage regulators. I have installed a voltage regulator that controls the voltage input for 40 cameras with a variance .5 to one volt. Density variations become serious only when the variance goes to two volts or higher.

Bobb: Check the electrical outlets to ascertain if voltage variances exist. I knew of a situation where coffee breaks resulted in

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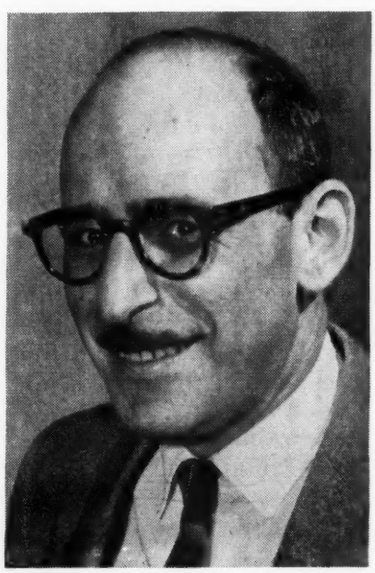

GERALD J. SOPHAR, Vice-President, Jonker Business Machines, is also President-Elect of the American Documentation Institute.

TWO IMPORTANT NEW ADVANCES IN TWIN-LENS REFLEX PHOTOGRAPHY

Twin-lens photography 'came of age' with the introduction of the Mamiya C2. Its exclusive lens interchangeability feature established it as the world's most versatile twin-lens reflex.

Now, with the availability of the new interchangeable wide angle lens and the new Porroflex image-erecting eyelevel finder, the Mamiya C2 is even more versatile than ever before. There is hardly a picture situation which this camera can't tackle.

NEW 65mm f3.5 WIDE ANGLE LENS Like lens interchangeability itself, twin-lens, wide-angle photography is now another Mamiya C2 exclusive. With Mamiya C2 you can interchange lenses at any time—from normal 80mm lens to 105, to 135 or 180mm telephoto or to the new 65mm wide angle lens—even in the middle of a roll, and get the field coverage that's "just right" for the picture. The new Mamiya 65mm wide angle lens is mounted in an M-X synchro-flash shutter, with speeds from 1 second to 1/500th plus 'B'. Its angle of view is 68 degrees. Price is $149.50.

NEW PORROFLEX IMAGE-ERECTING EYELEVEL FINDER The Porroflex is an ingenious mirror system that interchanges almost instantly with the standard waist-level hood, and permits you to focus and view at eyelevel whenever you choose. The image is bright, erect—right-side-up—and unreversed. Focusing is fast—positive—and the entire field is seen at a glance—even with glasses. The new Porroflex is much more manageable and more convenient to use than a prism finder. It weighs less, is less bulky and less costly. Price is only $29.95.

P. S.—There is also a Porroflex finder (Model R) for Rolleiflex cameras with removable hoods—same price.

Initial supplies of these exciting new C2 accessories will be limited. Be sure to reserve yours early at your Mamiya dealer. For literature and the name of your nearest dealer, write Dept. IP-4.

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NEW
EYELEVEL
FINDER

NEW
WIDE ANGLE
LENS

FOR THE MAMIYA C2

Circle No. 558 on Post Card

continued from page 38

the turning on of hot plates that pulled a sufficient amount of current to affect the electrical input to the cameras.

Hamp: In many cameras in use today a two-volt change produces approximately a .1 difference in density on commonly used microfilm emulsions. While this represents the full variance of a CVT, most transformers operate well within this variance at normally used exposure voltages and with "good" line inputs. If the line to the CVT is subject to wide fluctuations or is extremely high or low, the best CVT would be hard put to do its job. Be sure the basic input fits the CVT rating properly, and the trouble can be minimized. It can never be entirely eliminated.

Q. It has been suggested that there is no system or logic in the selection of material to be microcopied. If you agree with this, how would you suggest the situation be remedied — what system would you (do you) use?

Carruthers: If this question refers to the preservation of library materials before they disintegrate, there is indeed a great need for a more systematic approach. The mass of material is enormous and is being added to every day. Many individual items and some small subject areas will undoubtedly be saved through personal interest or just by plain chance when someone happens to call for a copy, but to make sure that the essential records in all areas are saved, there must be some general agreement on what is essential and some concerted effort.

Clapp: There is little evidence of system or logic in the selection of material to be microfilmed. Microfilm projects typically reflect the interest and organizing ability of a few individuals. Greater logic or system would be introduced if the planning were more widely based.

Weber: A library should apply the same selection criteria for material on film as it does for books, and this applies to film ordered for acquisition as well as to film made for preservation. Thus, the logic is generally the sound one of "demand"; and the thousands of individual needs which lead to filming may be said to form a worldwide scholars' insurance program against the loss of research material. The total effort constitutes a logical system. Through publicity for all major film projects, the Microfilming Clearing House in the Library of Congress is designed to reduce wasteful duplication in filming projects. A cumulative list of master microfilms is, however, urgently needed in order that future microfilming efforts are not wasted.

Q. How do you illuminate a

WHY AIR FORCE HAS ADOPTED MICROFILM FOR ENGINEERING DRAWINGS

Recently the Air Force issued new contract requirements of vital importance to companies that are doing—or intend to do—business with its various activities. In essence, the Air Force has made the use of microfilm mandatory for most engineering data and records relating to items delivered by contractors and their vendors.

The new requirements (MCP-71-77) incorporate standards and specifications issued earlier by the Department of Defense for its Engineering Data Micro-Reproduction System. The Air Force move is indicative of the importance of microfilm to the government in saving time, money, and space.

The Air Force is convinced that working with microfilm is easier than working with paper, that it is more efficient and costs less. Filmwork, in other words, is easier and more practical than paperwork for engineering drawings and records.

This is not news to the many industries that use microfilm today. They know that microfilm is a highly efficient and effective production communication tool. They know that microfilm can do many jobs much faster and much more accurately, with almost fantastic savings in time and money.

3M makes microfilm easy to use

copyboard evenly? Even under ideal conditions, there is inevitably a variance from a low at the back center to a high at the side center of more than .2. This means than an image cannot be illuminated evenly enough to meet government specifications.

Jewell: Our images are not illuminated evenly enough to meet government specifications since variances range from a low of .1 to a high of .5. However, this range meets our requirements, as we microfilm, for the most part, company records for security purposes only.

Hamp: The real problem here is the low back center area on many planetary cameras due to the shadowing effect of a tower close to the photographing area. In some cases, small metal or cardboard reflectors have minimized this problem. The illumination level in the corner areas should be higher than the center. The ratio may be as much as 4:3 for certain camera lenses. Small "hills and valleys" in the copyboard cause problems. Backlighted boards can be helpful in minimizing the lighting problem. In some cases, the manufacturer's arrangement for lighting may require modification.

Bobb: The first step in attaining even overall copyboard illumination is to measure the footcandles of light falling upon the copyboard. The measurements should be taken at the four corners of the copyboard and across the center, top-center-bottom and left-right edges. Once the light variations are known, then corrective measures can be employed such as rearranging the position of the lamps or by adding auxiliary lamps for fill-in purposes.

Q. What are the advantages or disadvantages in storing microfilm on shelves as opposed to storage in filing cases? Have you any other places or methods of microfilm storage?

Weber: Given suitable atmospheric conditions, film may be stored in a great range of compactness. Selection of one method would depend on the concentration of use on certain films, the usual and unusual use spread over the entire collection of film, and on the physical limitations of the library building.

PANELISTS NOT PICTURED

R. H. CARRUTHERS is Chief of the Photographic Service Division of The New York Public Library, one of the largest libraries in the world.

VERNER W. CLAPP, as President, presides over the activities of the Council on Library Resources.

EUGENE C. JEWELL is Microfilm Supervisor for the Public Service Electric and Gas Company, Newark, N.J.

DAVID C. WEBER has been Assistant Director of the Harvard University Library since 1957.

HELEN M. WELCH has headed the Acquisition Department of the University of Illinois Library since 1952. It handles all of the library's photographic work.

When data is on microfilm in FILMSORT Aperture Cards, facts that speed production are at your finger tips in just 90 seconds. And with a THERMO-FAX "Filmac" Reader-Printer you can take more than a look—you can take an enlarged copy in seconds.

Microfilm really became practical for industry only a few years ago when Minnesota Mining and Manufacturing Company introduced THERMO-FAX "Filmac" Reader-Printers. For the first time, the advantages of a reader and a printer were combined in one compact, low cost unit. Today there's a "Filmac 200" Reader-Printer that has a huge viewing screen, simple pushbutton operation, makes copy after copy in 18" x 24" size or half size prints of engineering drawings and data from microfilm in FILMSORT Aperture Cards. A "Filmac 100" Reader-Printer delivers 8½" x 11" copies in seconds, too.

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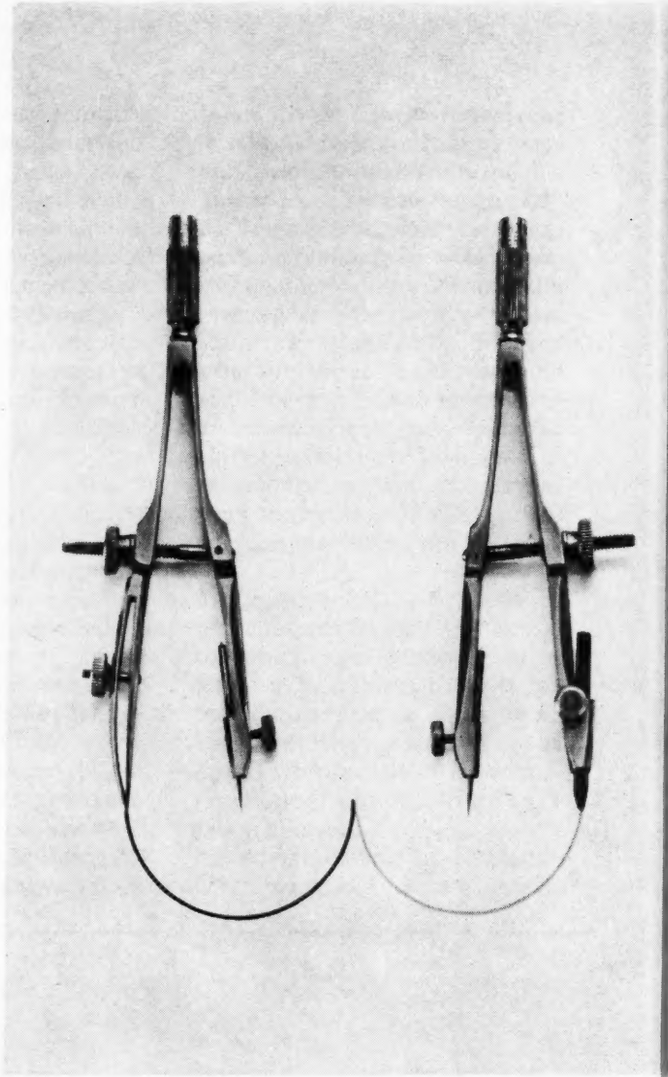

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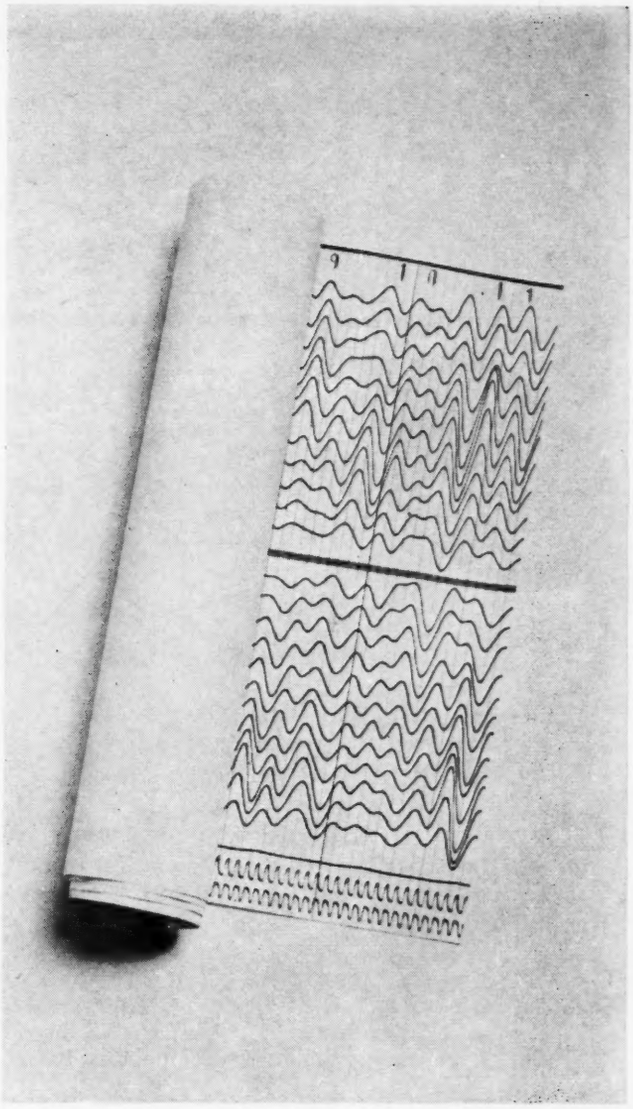

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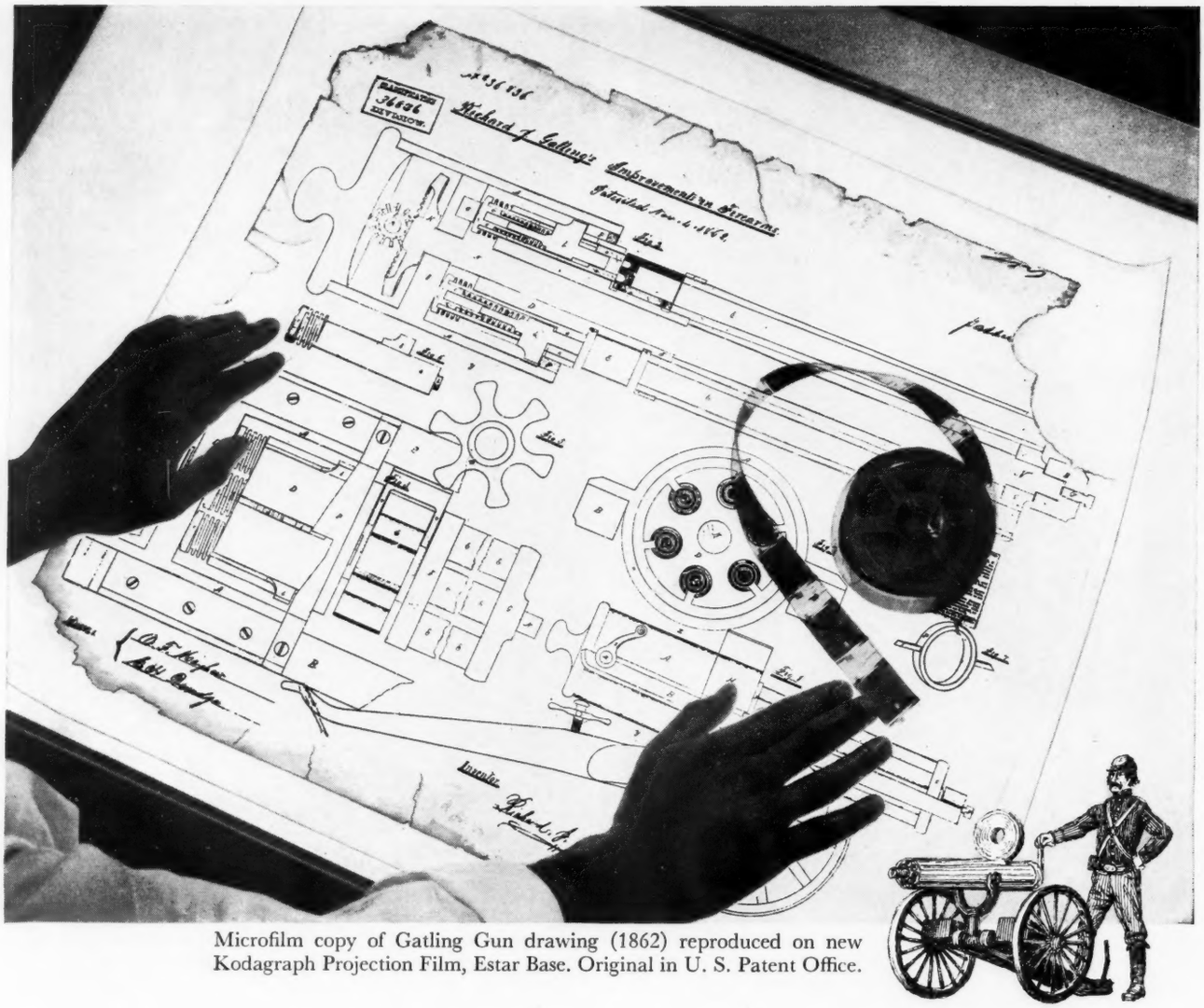

Microfilm copy of Gatling Gun drawing (1862) reproduced on new Kodagraph Projection Film, Estar Base. Original in U. S. Patent Office.

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New Kodagraph Projection Film, Estar Base, produces change-in-scale intermediates that will stand up under the heaviest use in drafting room or print-room.

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INDUSTRIAL REPRODUCTION

Two Problems - Two Solutions

Reproducing printed circuits and rejuvenating street plans have one thing in common — neither is as hard as it sounds.

by HAL DENSTMAN and MORT SCHULTZ,
Lockheed Electronics Co., Stavid Division

A job that appears to be a difficult reproduction problem may, in reality, have a simple solution. This became apparent to us recently in two separate jobs. One dealt with reproducing a combination of electronic waveguides and printed circuit boards to exacting accuracy. The other was concerned with reproducing large original drawings of city street plans that were in poor condition.

Reproducing Waveguides

It is not unusual for the Reproduction Section to be consulted by engineers for advice on or a solution to an engineering problem. This happened recently when we became involved with construction of a microwave tube that would hold a number of printed circuit boards.

When completed, it was intended to have the plated circuit boards used as part of the waveguide itself. To us this meant a problem of holding very close tolerances in the reproduction and registering of the plated boards inside the waveguide tubing.

Since more than one pattern was used, the registration problem seemed a difficult one: alignment had to be done inside the tube and could not be visually inspected or registered. We divided the problem into two parts: (1) obtaining an accurate film positive within tolerances of 1/3000 of an inch for plating purposes; and (2) developing an accurate registration technique.

In attempting to obtain an *accurate film positive,* we used the following steps:

1. We had the Drafting Department draw an original of the plated board to eight times larger than the final reproduction would be. Since our final size was only two inches high, the layout man was able to work without difficulty with an original 16 inches high. This resulted in a very accurate drawing.

The original was drawn with a flat black ink, which is ideal for reproduction with reflected lighting. If he had laid the original out in tape, as is the custom with many conventional printed circuit boards, we would have used transmitted lighting (rear illumination) to cut down reflections from the tape.

2. The next step was to measure the original drawing, which proved to be only 1/64 of an inch in error on the 16-inch dimension. This meant that in making our reduction to one-eighth of the original's size we would still be within our tolerance of 1/3000 of an inch.

3. To insure that we held the size as close as possible in each step while making the reproduction from the original, our Robertson reproduction camera was checked for alignment accuracy at a 1:1 scale. If accurate at 1:1, any reduction would also be exact.

The camera was checked by means of a simple alignment chart drawn on a Mylar material. It was made to a dimension of 20-inches square (Figure 1). A dimensionally stable film (in this

continued on page 48

HAL DENSTMAN (R) has headed the reproduction section at Lockheed for the past five years. Last year he addressed the PP of A's Industrial Photographic Conference.

MORT SCHULTZ (L) is a Lockheed technical writer. Together they are co-authoring a book on engineering reproduction.

INDUSTRIAL
REPRODUCTION

Too Much Paperwork?

Find new ways of doing it. That is what the New York State Department of Public Works did with great success.

New York State's Department of Public Works is in the midst of record construction programs. In the past two years, as more and more highway and building projects were planned, let and carried out, the work load on the department's Bureau of Office Services, which produces the design prints, became more than its machines could handle.

In the course of seeking a solution to the problem, the department turned to the Tecnifax Corporation of Holyoke, Mass., for advice. Between the two organizations a new method for the production of prints has been found which is paying off in huge dividends for the state.

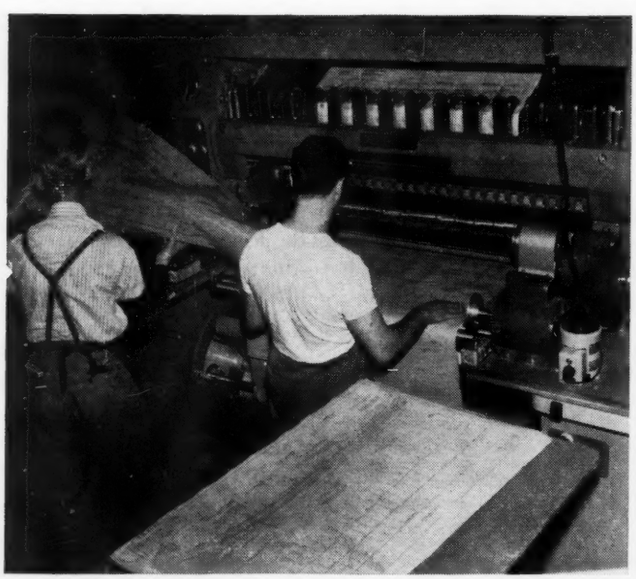
The new method utilizes high-speed, ammonia-developing diazotype machines: two Tecnifax Hi-Q Diazo processors and a Paragon-Revolute Star. Each set of originals is printed on a continuous 36-inch wide web of diazo-sepia intermediate paper. The operator adjusts the printing speed for each original to achieve uniform density in the intermediates. The speed for processing the intermediate runs from 10 to 16 feet a minute.

The operator is assisted by a second operator, who removes the originals as they emerge from the machine and re-stacks them. The originals are printed on the web in a specified sequence, eliminating collating at the end of the printing operation.

The sepia web is rewound on a motorized shaft as it emerges from the rear of the machine. When a complete set of originals is printed, the sepia web is transferred to an unwind shaft at the front of the machine.

A roll of 36-inch wide diazo-blue paper is fed into the machine, the sepia web is superimposed, and the production of blue-line prints begins. Since the entire sepia web carries approximately the same amount of background, the blue-line web is processed automatically at speeds up to and over 100 linear feet-per-minute. Complete development is achieved consistently.

As the blue-line web emerges at the rear of the machine, it is



UNIQUE APPLICATION of the Tecnifax Hi-Q Diazoprocessor to the requirements of the New York State Department of Public Works.

PRINTED SEPIA WEB is re-wound on a motorized shaft at the rear of the machine. Torque motor adjusts to varying machine speeds.

cut into individual prints on a Tecnifax Paper Cutter. One man operates the cutter with a foot pedal. A second operator (the one who removed originals at the front of the machine) assists him in guiding the web through the cutter and in stacking the prints. The two men can easily keep up with the speed of the web. As each set of prints is completed, it is stapled.

As the sepia web emerges at the front of the machine, it is taken up by a motorized shaft. After each set of prints is completed, the sepia web is rewound back to the un-wind shaft to restore the original printing sequence. This rewinding operation takes only a few seconds.

The web is then ready to produce another set of blue-line prints. The procedure is repeated until the required number of sets is produced. The excellent "tracking" characteristics of the Hi-Q make it possible to unwind and rewind the web repeatedly and without any difficulty.

Until the new procedure was inaugurated in July, 1959, the Bureau of Office Services used five blueprint machines, plus two moist-diazo machines. Twenty-three employees were needed to carry out the printing job, plus such allied tasks as trimming and collating the prints. Still this wasn't enough. Only about 60 per cent of the needed prints could be produced by department facilities. The rest had to be farmed out.

Not only do the department's new print reproduction facilities take care of all requirements now but there have been substantial savings in money, personnel and time, and such fringe benefits as minimized wear and tear on costly original designs.

Specifically, development of the high-speed diazotype machine process has produced these results:

Vastly increased capacity. A day's work for the seven former machines produced about 40,000 print copies. Just one of the new machines can turn out 50,000 copies in a day.

Reduced personnel needs. — — from 23 to eight.

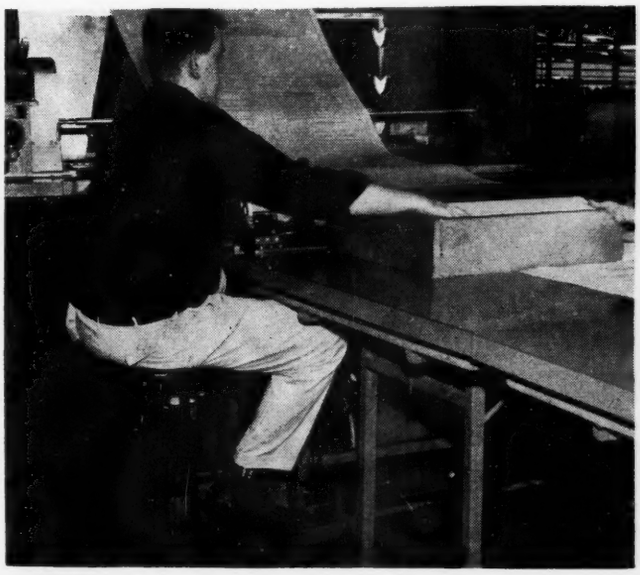
Valuable original drawings are preserved. The old blue-printing process subjected these to considerable wear. Now they are only used once in the reproduction process. An added bonus appears in the form of a "second generation" original which is produced through the new process. This intermediate stage "original" does the actual printing and can replace a worn drawing. This is particularly true when you consider that highway officials in the states of Michigan and Illinois, for example, value the original set of drawings for a project at an average of $4,500.

Waste is greatly cut. Under the old method an average of 10 per cent of the print paper was wasted. With the new process, less than one per cent goes into the scrap heap.

Development of the new process also provides an alternative method of producing the reduced-size prints supplied to prospective bidders on public works projects. These prints are reproduced by the photo-offset process but can be printed by the diazo processing method.

An added bonus was a sharp upturn in worker interest. Whereas employees before had to handle the same originals 25 to 90 times, the new technique spins the prints through the processing machines at speeds up to 120 linear feet a minute. The monotonous routine is automated and a policy of continually "trying something new" sparks employee interest in the job.

Major credit for the system belongs to state officials J. Burch McMorran, Joseph P. Ronan, Joseph F. Reilly and Frank Springsteen. □



SCISSORS-TYPE CUTTER is operated with a foot pedal, leaving the operator's hands free. It also is a Tecnifax product.

WHEN A SET of prints is completed, it is stapled. No collating is required because the prints emerge in correct sequence.

INDUSTRIAL REPRODUCTION

Work Together

The reproduction field is not only growing in size but in complexity as well. Almost every day new processes, techniques and methods are marketed, creating varied and difficult problems of development, selection and use.

These problems must be faced by both in-plant and commercial reproductionists in terms, among other things, of cost, time and quality. One result of this is that a higher degree of communication and cooperation is taking place between in-planters and out-planters.

The commercial reproductionist, by the very nature of his business, has become an expert in almost all kinds of reproduction. Traditionally, he has worked with blueprints, whiteprints, brownprints, photocopies and film processes of all kinds. Comparatively recently, he has added such services as projection photocopying and enlarging, photo-offset printing, lithogelatine printing, microfilming, electrostatic printing and the preparation of Vu-Graph, lantern and 35mm slides for visual aids. His advice can be valuable to the operators of in-plant repro departments.

If, for example, an in-plant repro manager is thinking of buying a new piece of equipment or of installing a new process, the experience of the commercial reproductionist may be helpful.

The International Association of Blue Print and Allied Industries, 33 East Congress Parkway, Chicago, publishes a free booklet, "Thirty Questions," which deals with the planning or setting up of in-plant reproduction departments. It touches on, among other things, such questions as: Can in-plant reproduction equipment deliver your work fast enough without being overstaffed and over-equipped? Can a plant-owned and operated reproduction department make blueprints and photoprints at a cost less than the commercial blueprinter if all costs of installation and overhead are considered? In considering costs are you prepared to go beyond the cost of actual materials and equipment? Are you remembering to total up labor, rent, light, power, depreciation and supervision? Have you considered the amount of time required to clean and maintain blueprint, whiteprint, photoprint and other reproduction equipment? Have allowances been made for possible overselling? Have you questioned the range of adjustment to changes in the reproduction scale?

In addition to advice, how can the commercial reproductionist work for the in-plant reproductionist?

In many cases, in-plant supervisors or personnel can turn to the commercial reproductionist for highly specialized services that it would not pay their company to do. Or the commercial reproductionist may, and often does, act as a "safety-valve" for sudden peak loads of work that cannot be handled by the in-plant shop.

Another function of the commercial reproductionist in his relationship with in-plant departments may be that of a supplier. Often commercial reproductionists are local distributors or dealers for national manufacturers and can provide quick delivery on products or fast repair service.

In the fluid exchange of ideas and information both the in-plant and the commercial reproductionist can gain new ideas and knowledge. A working relationship thus established is of benefit to all. □

TWO SOLUTIONS

continued from page 45

case, Eastman Kodak's Estar) was used to make the alignment test. *This film was the same material used to make the reproduction.*

4. After making the test and insuring camera accuracy, we photographed the original drawing on Estar film (.007). This first exposure was made for a reduction of 4:1, since the camera is not capable of reducing eight times in one exposure. We developed the film in a fine-line developer, using still development for maximum sharpness and retention of fine detail.

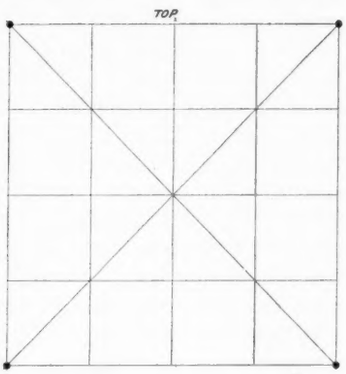


FIG. 1 CAMERA ALIGNMENT CHART

5. The negative we obtained was spotted and transferred to another sheet of Estar film by use of a vacuum frame and a pin-point light source. The result was a sharp film positive of extreme accuracy.

6. This 4:1 film positive was put back into the Robertson camera and reduced 50 per cent to its desired size of 8:1. Again, development was done in fine-line developer using the still technique.

7. Our final size negative was then transferred to a film positive on Estar material by using the vacuum frame and pin-point light source. The final working positive, extremely accurate, was now ready.

After the final positive was carefully measured and approved for dimensional accuracy by the Engineering Department, we were ready to tackle the second

part of the problem — finding a way to register the printed circuit image inside the waveguide tube. Specifications called for two patterns inside the tube that were facing each other; in other words, two images in reverse of each other that could be placed face to face in perfect registration (Figure 2).

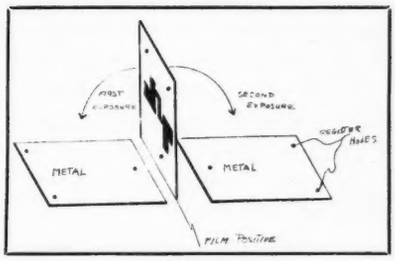


FIGURE 2

We could not expose the circuit boards separately, because there would be a problem of aligning them in the final step. Therefore, we had to find a registration technique we could apply before making the exposures onto sensitized metal. We did it this way:

First, a sandwich, consisting of two sheets of copper-clad epoxy glass with our film positive in between, was made. The sandwich was taped together.

Next, three holes were drilled through the sandwich with a drill bit that matched in size the registration pins lithographers use for registering separation negatives (Figure 3). This provided us

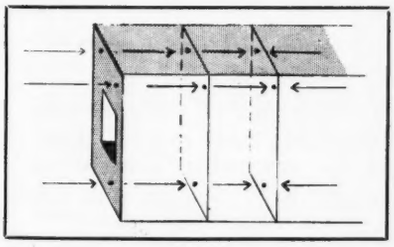


FIG. 3
CUTAWAY VIEW OF WAVE GUIDE TUBE

with a registration device for alignment of the two circuit boards after our exposures were made. With the holes drilled, we untaped our sandwich and were now ready to make the exposures.

The two sheets of copper-clad epoxy glasses were coated with Photo-Resist to sensitize them. One sheet of the glass was lined

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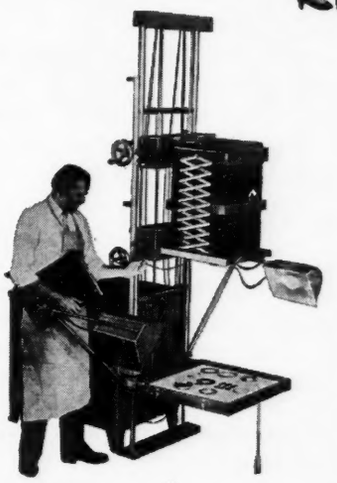

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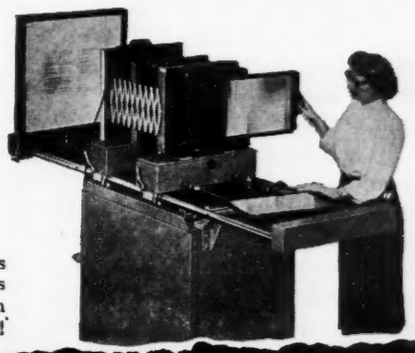

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TWO SOLUTIONS

continued from page 49

up with the film positive, using the registration pins through the perfectly aligned holes in both. This exposure was made with the emulsion of the positive facing the metal to provide a reverse-reading image. The second plate was lined up with the film positive in the same manner, but this exposure was made with the backside of the positive placed against the glass to provide a right-reading image.

Our plates were then processed through the required plating and etching baths to produce two sheets of epoxy with clear backgrounds and metal images. The outcome were two sheets with images in reverse of each other.

When placed face to face and aligned by using the three metal registration pins through the drilled hole, the images were aligned exactly in the waveguide tube. In the final result, the waveguide itself, the metal plates containing the images were positioned facing each other at a distance of ¼ of an inch. The distance didn't matter because of the extreme accuracy of the reproduction and registration.

Rejuvenating Poor Originals

A city bureau we know of had the problem of rejuvenating a large number of city street plans that were unusable because of their poor condition. Those drawings had been used for a number of years to provide diazo prints of street plans to contractors, engineers and others requiring the information.

The originals were drawn in ink on linen, making them excellent file copies, but they were not stable enough to withstand the wear and tear of years of handling.

Redrawing the plans was quickly discounted as a solution because of high artist costs and red tape involved in having new drawings approved by the agency concerned with each drawing. To keep costs low and eliminate red tape, it was decided to turn the project over to a reproduction laboratory.

As you know, there are a number of ways of handling this type of job. The problem, however, was to find a way to reproduce the plans in the minimum amount of time and at the lowest cost for materials, and still produce quality reproductions.

Prime Consideration

The first consideration was to find a suitable stable material on which to make the reproductions, since they would receive the same rough handling as the originals. The material selected was Ozalid Mylar Black Line Film (matte base).

Before the reproductions could be made, all undesirable marks and dirt had to be eliminated. In addition, something had to be done with tear and crease marks. To accomplish these ends, the original drawings were printed on translucent sepia diazo paper, which produced good intermediates. With this paper, it is possible to remove any area by chemical erasure. Thus, all undesirable marks and dirt, including marks made on the reproduction by tears and creases on the original, were eliminated from the diazo paper.

In those areas where the poor original produced high background density on the sepia reproduction, a razor blade was used to cut out the unwanted areas. This cut-out technique was also employed to remove lines that reproduced poorly on the sepia, with the intention of drawing them back in on the final Mylar prints.

Once the sepia prints were readied, the final Mylar prints were made. To do this, the image on a sepia print was placed in contact with the emulsion of a piece of Ozalid Mylar Black Film. Both were then run through the diazo machine.

The speed of the diazo machine was controlled, so none of the background areas or cut-out line areas were reproduced. The outcome was a reverse reading final print from which it was possible to make as many extra prints as required. As mentioned before, the lines that were cut-out from the sepia because of their poor quality were drawn back in on the Mylar final print.

This entire job cost the city bureau an average of 50 cents per square foot of drawing, as compared to the dollars it would have cost to redraw the plans. In addition, it was done in quicktime.

As a reproduction technician, you should remember that a technique such as this is excellent for getting high quality reproductions of needed originals that are in poor condition. Another use can be made of this method in making changes on an original, while still maintaining the untouched original. □

SELLING MICROFILM

continued from page 30

have found in your company and answers you have gained. Demonstrate equipment relevant to the microfilm program you are outlining. Show your story.

10. ***Keep your proposal and demonstration simple.*** Too many system proposals never receive attention because the technical language confuses the reader or observer. When your meeting with management has concluded, your audience should walk from the room with a complete visual picture of your plan and the ability to discuss what they have seen and heard. □

continued from page 8

trouble I encountered is with very deep blue skies, which take on a purplish hue. Reds, although not as brilliant as on the old film, are very good, as are greens and yellows. My main complaint is that the blue skies reflecting on pavement make them take on a purplish hue, too.

Skin tones are excellent and blonde hair photographs are as close to real blonde as I've ever seen. The film does a pretty good job with redheads as well.

Processing

The film will be developed by either Eastman Kodak or its licensees. Service, we were assured, will be as usual — good!

Conclusion

It is my opinion that in the new film we have a splendid tool to work with. I like the pastel quality this new film gives compared with the strong, often harsh, results given by the old Kodachrome. Its soft colors are more pleasing to the eye and do not over-exaggerate as do the harsher tones of the old material.

At this writing I have not received any TYPE A film and will report on my experiments with this film in a later column.

I must report that the movie film gave me more pleasing results than did the 35mm film used in a still camera. Perhaps because of the motion in the pictures, the colors seemed more pleasing, although in both instances I photographed the same subjects. We must remember, though, that a still picture can be more minutely examined than can a picture which lasts on the screen only a fraction of a moment. For the present it will be made only in 8mm and 16mm sizes for movie cameras. □

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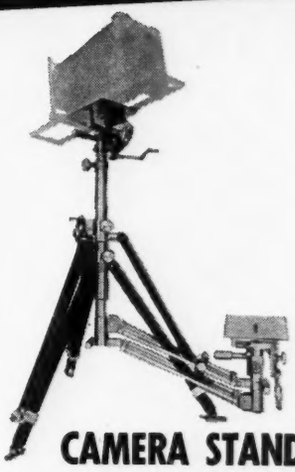

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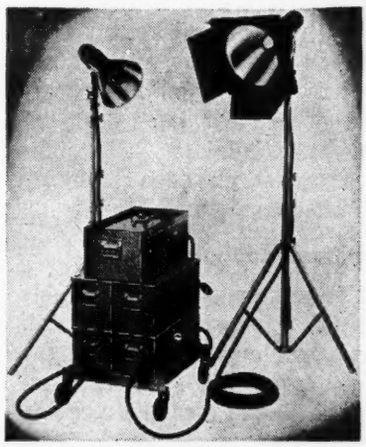

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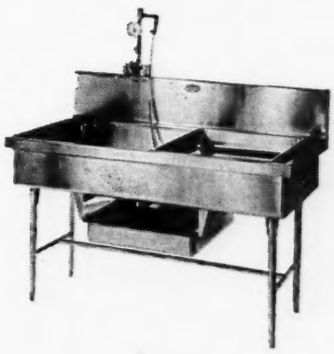

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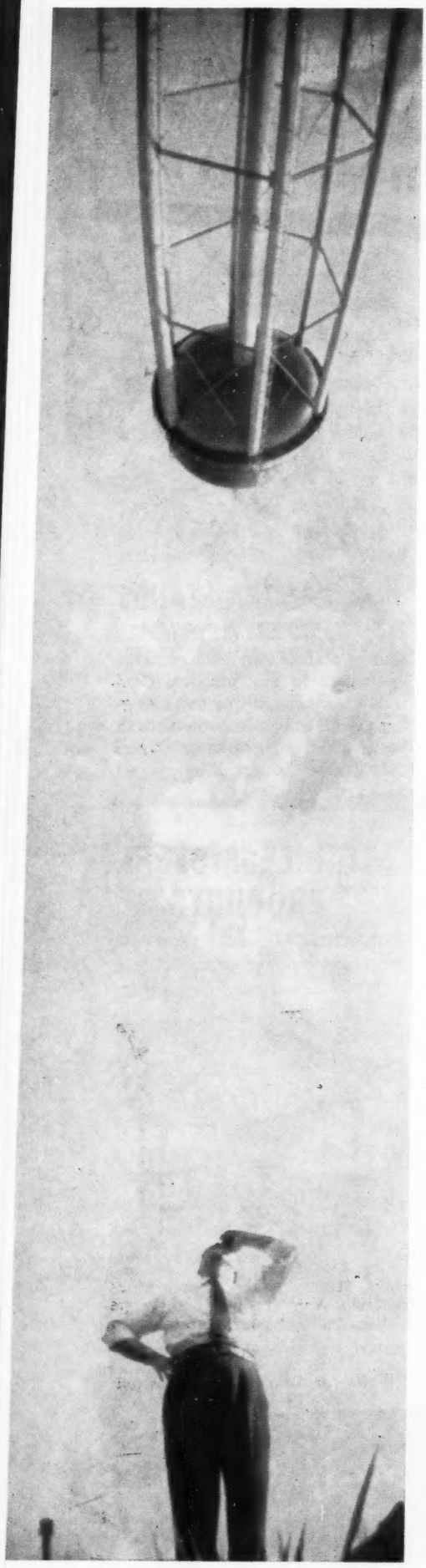


Special Job, Special Camera

You can't look inside a combustion engine with a box camera. It takes a most unusual instrument, like Detroit Diesel's specially designed liner camera.

by JAMES HUGHES
Executive Editor

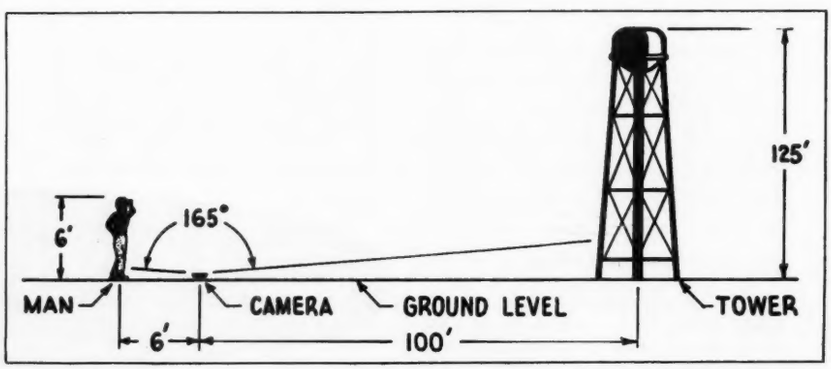
Until the liner camera came along, a continuing problem for the Detroit Diesel Engine Division of the General Motors Corporation had been the photographic recording of the appearance of cylinder liner port deposits and cylinder wall conditions in various engines during and after test.

Not Good Enough

Conventional photographic methods left much to be desired. The usual angular shots of the port area are inadequate and inaccurate because of the receding and unrevealing perspective. Pictures of the port area reflected from a conical mirror resting on top of the piston are most difficult to interpret because of the distortion.

Previous Procedure

The method most consistently used to record port condition had involved the following: inserting positive paper into the liner and holding it in place against the liner wall with an inflated balloon. A neon tube was then inserted in and around the airbox



to expose the paper, showing the unplugged areas of the ports. This method was extremely time consuming (the engine had to be stripped down to the bare block) and did not always give the true condition of the ports.

Because of general dissatisfaction, it was decided to design a special camera, one capable of making a picture showing the complete liner in its true condition with no distortion.

Liner Camera

The liner camera uses a pin hole in place of a lens. The restrictions inside the liner are such that no lens could be designed that would meet all the necessary specifications.

The abstract principle of the pin hole is that an exceedingly small hole will admit only one ray of light from any given point on objects in front of the camera. These light rays enter the pin hole from all points and form an image on the film plane of the camera.

Film Plane

The first problem to be solved in designing the camera was the construction of a film plane in which there was no apparent distortion. One important quality of the pin hole principle is that it has universal focus. So, in the construction of the film plane, the focal length could vary without causing an out-of-focus condition. In the construction of the film plane, it was only necessary to hold the ratio of the film plane to the subject plane constant through the pin hole.

After construction of the camera body, it was necessary to make a pin hole that would give the clearest possible pictures. The larger the pin hole, the larger the light ray admitted, and the overlap of these light rays causes a fuzzy image. Therefore, the smallest usable hole would give the best overall sharpness.

Various Diameters

During development of this camera various diameter pin holes from .030″ to .009″ were used. The larger pin holes allowed shorter exposures and covered wider angles, but the best overall results were obtained with a .012″ diameter pin hole in .0015″ stock. The angle of coverage is 165 degrees and covers 192 degrees of the subject plane.

Some difficulties were encountered in lighting the subject plane, and various tests were made to find a reflector to put light on the port area. The final result was a cone reflector installed at the base of the camera.

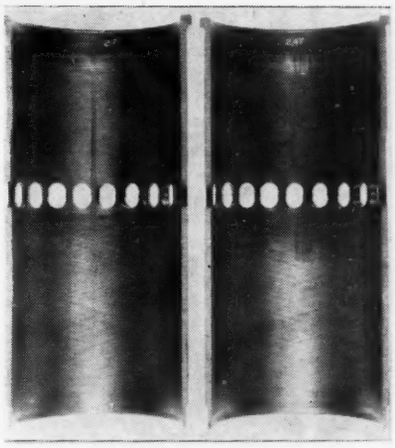
Facilitates Recording

The use of this camera facilitates recording of liner condition at any time during the test period, since it is only necessary to remove the cylinder head and insert the camera in the liner bore on top of the piston when the ports are fully exposed. Two pictures are taken inside each liner; one of the blower side and the other opposite the blower. Each of these pictures covers slightly over 180 degrees of the liner and when spliced together show the condition of the entire liner area.

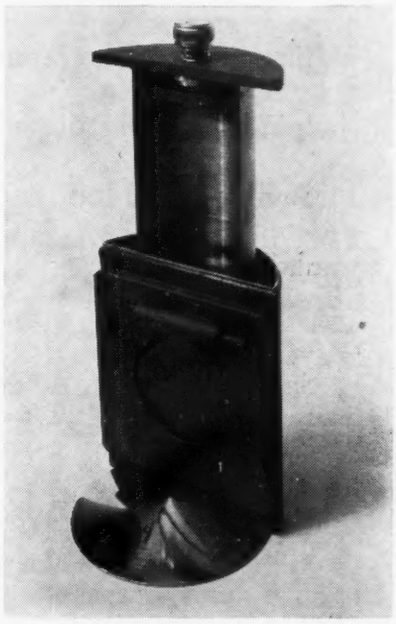
Simple To Operate

The operation of this camera is as simple as a Box Brownie. A bulb shutter is opened after the camera is inserted into the liner and the pin hole (or aperture opening) is so small, .012″ diameter, that available light has no apparent effect on exposure. A No. 5 flashbulb is fired above the liner and its duration of approximately 1/50 sec. controls the exposure time. The shutter is then closed, the camera removed, film changed and the camera is ready for the next exposure.

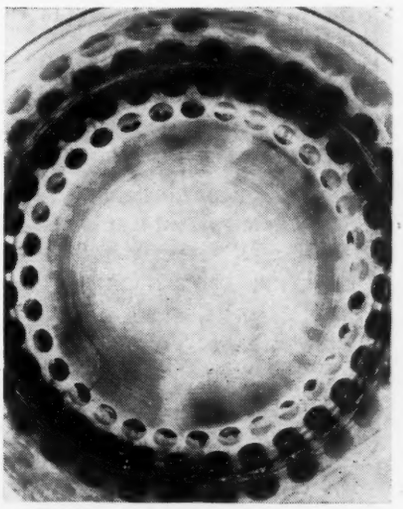
This camera greatly reduces labor costs in the Detroit Diesel photographic department. Pictures can be taken by one man in less time than it previously took two men using the positive paper method. It also saves time in processing because these negatives can be spliced directly with no retouching or copy negatives. □



SPLIT LINER. After recording liner port condition by old photographic method, liners were removed and split. Splitting the liner terminated any further testing.



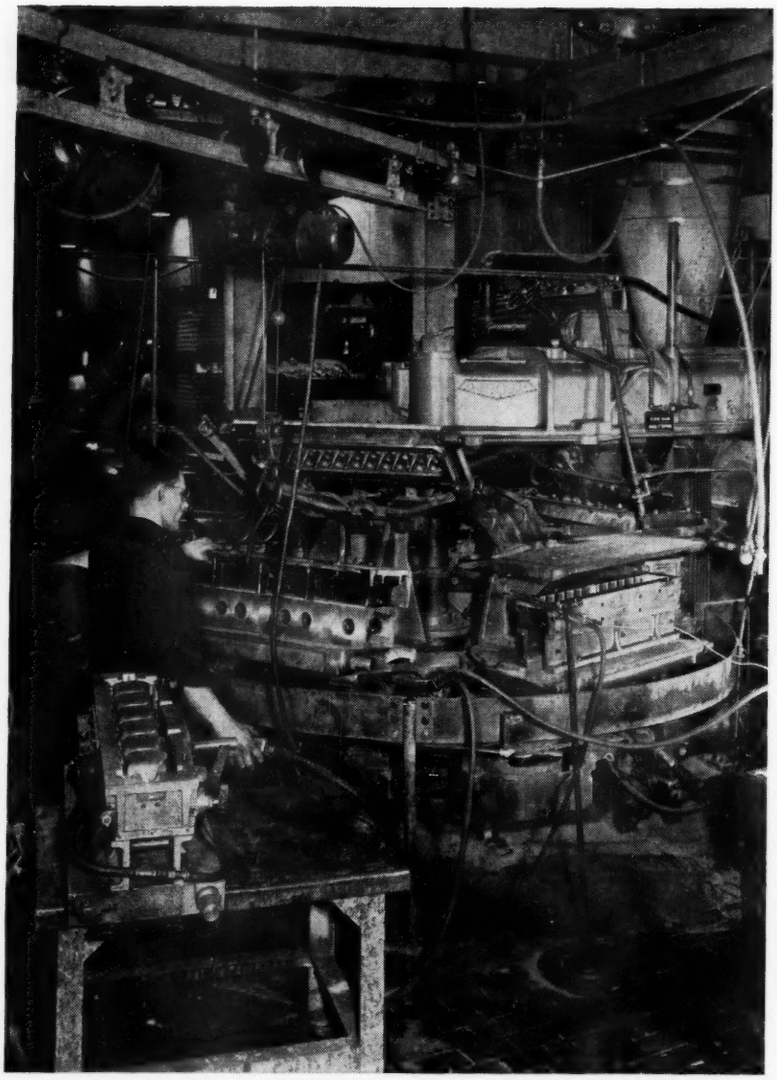
LINER CAMERA. It facilitates recording of liner condition since it is only necessary to remove the cylinder head and insert the camera in the liner bore on top of the piston when the ports are exposed.



CONICAL MIRROR installed on top of piston. Part of an older method of recording the appearance of cylinder liner deposits and cylinder wall conditions.

Core of the Matter

A film comes to the rescue, helping Osborn salesmen promote an 8-ton coremaker.



CORE-MAKING MACHINE creates sand cores used in casting cylinder blocks for auto engines. Film demonstrating machine in slow motion is used by salesmen for promotions.

The sample case has been the salesman's trademark for many years and remains an effective selling device. Its application is limited, however, since the products carried must be light and portable — neither of which applies to heavy equipment. The Osborn Manufacturing Company of Cleveland, makers of foundry machinery, wanted to equip its salesmen with a "sample kit" to demonstrate the qualities of its automatic coremaking machines.

Substitute Sample Kit

They decided that a brief movie shown by salesmen on a portable projector might provide an effective substitute for the sample kit. A movie would have the added advantage of being able to show the equipment in slow motion.

Since the company did not have any in-plant film facilities and had no continuing film program it turned its problem over to Wilding, Inc., an independent film producer with main offices in Chicago. L. T. Young of Wilding worked closely with Osborn's Leon Miller, vice-president in charge of sales.

Scenes of the machine in use were shot at the International Harvester plant in Indianapolis and Ford Motors in Cleveland. One of the most difficult obstacles the crew overcame was shooting around posts which were in the wrong position for good angles.

In one instance they circumvented the problem by reversing the normal direction of the coring machine so that they could shoot from a reverse angle and thus keep posts out of the way.

Producing the film from the time of script-writing took one year. The delay was due to not being able to shoot at Ford Motor Co. for eight months. All the footage was gathered in ten days.

The film was shot with a 35-mm Mitchell camera. Narration was provided for the sound track with synchronization of normal plant sounds. Cost of the 14-minute, 16mm black-and-white production was $15,000.

Fifteen prints are now circulated among salesmen who use a custom-built portable projector which shows the film as a continuous loop. □

TECHNICAL TRENDS

continued from page 11

transformer to provide the current from main voltage; on the top, upside down, any Rollei model with a detachable focusing hood can be placed. The normal camera focusing movement is used and the viewing lens is capable of projecting pictures up to about 18 inches square from a 2¼-inch square transparency. An additional slide carrier is available for 2 x 2-inch transparencies. This accessory will be available this spring.

Another exposure meter using a cadmium sulfide photocell was shown by Gossen under the name Lunasix. Externally, this meter resembles the Bewi Automat but has two operating buttons on the right hand side in place of one. On the Lunasix, the dark colored button is used for low lighting levels, the light-colored button for high levels of illumination. On releasing the button, the pointer is locked. The total range which the meter will cover is from 0.014 foot-candles to 14,000 foot-candles. The meter can be used for both incident and reflected light readings and covers film speed settings from six to 12,000 ASA. In practical terms it will give exposure readings from 1/1000 second to eight hours and f-stops from *f*/1 to *f*/90. For movie work, it indicates frame rates from eight to 128 per second.

A new entry in the field of color material was Kranseder of Munich. Heretofore, this small manufacturer has specialized in monochrome materials, but the examples of their color film shown under the name Kranz Color C 18 appeared to be of good quality. The film is a substantive reversal material with a speed of 50 ASA and is available only in 36-exposure cartridges of 35mm.

Lane of Sweden showed a useful prism attachment for Hasselblad and Rollei cameras with interchangeable hoods which

continued on page 57

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Maintenance Means Proper Projection

Don't let improper care ruin your company's motion picture showings. That "out of focus" look may be due to no more than some easy-to-remove particle.

The manufacturers of 16mm movie projectors have done right by the users. They have provided them with an assortment of versatile, reliable machines. But they are *machines,* and as such do require *proper maintenance.* What do we mean by proper maintenance? In the case of projectors, we more often than not mean *cleanliness.*

Dirt and oil or fingerprint smudges on a lens ruin screen definition, give the picture an "out of focus" look. Dirt, fuzz or hair in the picture aperture is distracting. Dirty pull-down claws or sprockets make the screen image weave and jiggle. Dirt and emulsion pile-up on the aperture plate or film gate will scratch the film. Oil and dirt on the sound lens will change its focus and cause the sound to be garbled. Dirt on the sound drum or impedance rollers will cause wow and flutter.

In order to do a good job, you must have the right tools. Your cleaner's kit should contain a variety of brushes: a half-inch wide paint brush about six inches long, a medium-size artist's brush and a round, stiff bristle brush small enough to get into the aperture and gate. Lint-free cleaning cloths and and liquid lens cleaner should also be included.

Before each showing, the film gate and aperture plate should be cleaned. Bits of oily lint can easily be wiped off. Caked emulsion is harder to remove but refrain from using a knife or other hard metal object. A damp cloth and a little elbow grease should be enough, but if it isn't, a copper penny, being softer than the steel or chromed part, can be safely used to scrape off the hardened emulsion deposit. Afterwards, it is good to go over the part with 4/0 emery polishing paper to make sure you have removed all hard-to-see particles.

Rollers are designed to roll, so when they get dirty or gummy they can cause film scratches, torn perforations, jiggle, wow, flutter and other distortion. Clean them with brushes and cleaning cloths. Use pieces of film or pipe cleaners to get dirt out of tight places. Should gum from tape adhere to any of them, clean it off with Trichlorethylene or carbon tetrachloride.

The units most often neglected when cleaning optics are the condensers, the reflector and the lamp bulb itself. These parts are usually enclosed and subject to an air blast from the cooling fan. Dirt and specks of oil from the mechanism can be blown on them and baked into the surface by heat. Get after these accumulations with lens cleaner. If they are allowed to burn into the surfaces of the condensers, they will be permanently damaged, especially if they are coated.

The picture lens should be cleaned with lens paper. A bit of oil or a fingerprint smudge can best be removed with a drop of liquid lens cleaner and lens paper.

Optics Can Be Tricky

Cleaning sound optics in 16-mm projectors is a precise and exacting job. Most machines use a lens to focus the exciter filament on the film and then some sort of prism or mirror, usually in an almost inaccessible location, to bend the beam around and into the photo-cell. Many late models include a magnetic head in the same area, which must also be cleaned. About the best bet is to remove the exciter lamp and clean the surface of the lens on that side. To clean the other surface, which is near the inside edge of the sound drum, and to clean the mirror or prism which directs the light to the photo-cell, requires some real dexterity with an artist's brush or toothpick wrapped with cotton. A flashlight and a dental mirror are useful when working in such tight places.

Stop Dirty Prints

There's no point in sending a "dirty" film through a clean projector, so examine prints before showing them. If the film is so oily and dirty that cleaning is necessary, it can be cleaned by re-winding it slowly through a doubled-over lint-free cloth so that both the emulsion and base are cleaned. The cloth should be saturated with Trichlorethylene.

With a clean projector and a clean film, the projectionist is well on his way to a successful showing — assuming the content of the film is up to his effort, of course. □

continued from page 55

enable the camera to be used conveniently at eyelevel.

New Leitz accessory equipment included an extremely compact reproduction unit, the Bellows Focusing Device, for the Visoflex II reflex housing and two new models of the Pradovit automatic slide projector.

The Bellows Focusing Device provides a focusing range from infinity down to seven inches with 90mm lenses, thus giving 1 to 1 reproduction. Lenses of shorter focal length give greater subject magnification, as usual, and the bellows draw is sufficient to give 1 to 1.5 reproduction ratio with 135mm lenses such as the new 135mm Elmar *f*/4. The device is calibrated to show reproduction ratio and exposure factors for all focusing distances when the 90mm lens is used, and a millimeter scale is provided for other focal lengths.

The whole camera-lens assembly can be moved as a unit to focus without changing picture size, the camera can be swung through 90 degrees to permit either horizontal or vertical pictures and adaptor rings permit the use of bayonet and screw mount Leica lenses from 35mm to 135mm focal length. A bellows lens hood is available as an accessory.

The two new slide projectors comprise an improved model of the Pradovit f and a completely new model with a low voltage lamp, the Pradovit n. Both provide fully automatic remote control for focusing as well as both forward and reverse magazine operation. Basic improvements include a quieter, faster slide change mechanism and a shutter which blacks out the screen between slide changes. The low voltage lamp of the Pradovit n is a new 12-volt 100-watt type which gives similar screen brilliance to a conventional 300-watt lamp but with cooler running.

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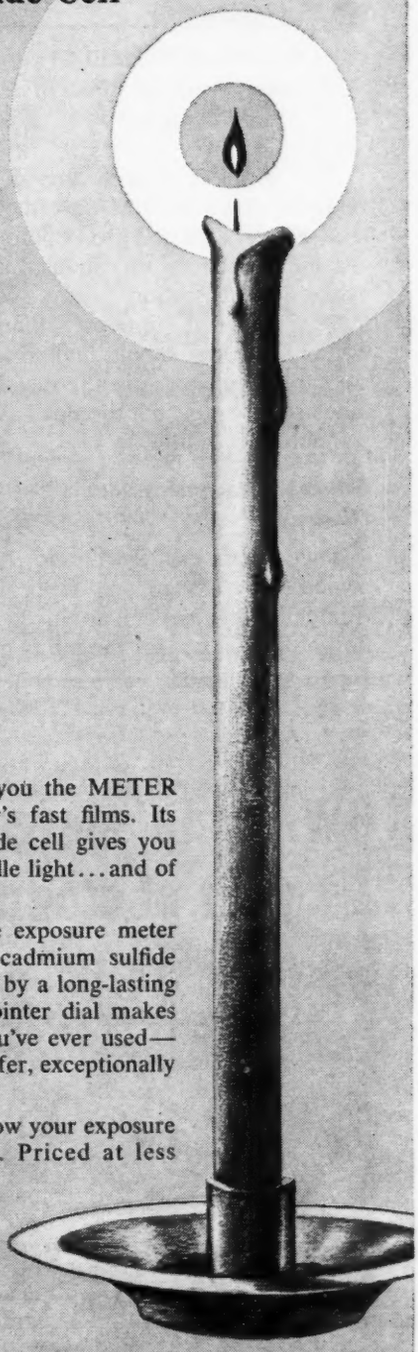
New Power Meter for "available darkness"

The Cadmium Sulfide Cell

SEKONIC MICROLITE



The Sekonic Microlite gives you the METER POWER you need for today's fast films. Its super sensitive cadmium sulfide cell gives you accurate readings even in candle light... and of course in brightest sunlight.

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sipley on patents

DR. LOUIS W. SIPLEY
Director, American Museum of Photography

This month's patents are diverse in character but nevertheless closely related to photographic practices in industrial establishments. Some are of more universal interest than others. The first should find considerable application in the metal industry where microscopy is standard procedure.

Camera Attachment for Microscope

This patent, *No. 2,967,456,* is owned by American Optical Company and covers an invention of an adapter for mounting a stereo camera on a binocular microscope. The special feature which is emphasized by the inventor is the light-tight relation provided between the camera objectives and the eyepieces of the microscope. The camera may be swung to operative position for photographing through the microscope and back to an inoperative position. This permits the observer to use the microscope directly. The light-tight character of this adapter permits time exposures where the images being photographed are not brilliantly illuminated.

Another feature of this adapter is the use of a base-in prism in connection with each eyepiece of the microscope. This neutralizes, as far as possible, the excessive convergence of the optical axes caused by the two-and-one-half degree angle of convergence usually provided by the eyepieces of a stereoscopic microscopic. When in the inoperative position the adapter leaves the microscope available for customary use.

Sound On Movie Film

A patent granted to Gerald H. Wagman of 62 Farm Road Circle, East Brunswick, New Jersey, and Arnold B. Baskin of 1706 Davidson Ave., New York City, bears the long title of *Apparatus for Recording, Playback and Erase of Sound on Magnetically Prepared Movie Film.* The inventors in their presentation emphasize that their device may be applied to "various silent types of motion picture projectors". The apparatus includes an adapter mounted on the upper arm which is standard on 8mm and 16mm projectors, in place of the film

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reel. The adapter is constructed with mounting for the feed reel and a magnetic sound track through which the film feeds to the projector. The magnetic heads are electrically connected to an amplifier which may be reversed and used for recording on the magnetic strip on the film. The film may be reversed without causing any trouble. Rewinding after complete showing of the film is accomplished directly from take-up to feed reel. The inventors place emphasis on the fact that this is easy, simple and inexpensive to use as compared to other sound-adding apparatus. *Patent No. 2,968,991.*

A Dark Room Camera

The above is the exact title given to *Patent No. 2,967,454* granted to Robert J. Alminana of 5542 Chestnut Street, Kansas City, Mo. The camera is intended for use in reproducing various types of opaque or partially transparent copy at the same size or at predetermined scales of reduction or enlargement. It is particularly adapted to making copies of large subjects or in making above average enlargements. The camera is built through-the-wall separating studio and darkroom and is of such construction that the rear and front assemblies permit lens holding means, negative or ground-glass or transparency supports, and are connected by bellows. With the lens on the front of the camera (outside the darkroom) copy negatives may be made without the necessity of passing through a lighted area en route to the darkroom after the exposure has been made. In reverse, enlargements or prints may be made without handling the sensitized paper elsewhere than in the darkroom itself by mounting the negative or a transparency at the front and the lens assembly at the end inside the darkroom.

A Border Printing Device

Agfa of Leverkusen have obtained a U. S. *Patent No. 2,968, 216* for a device intended to au-

ONLY ONE CAMERA IN THE WORLD HAS
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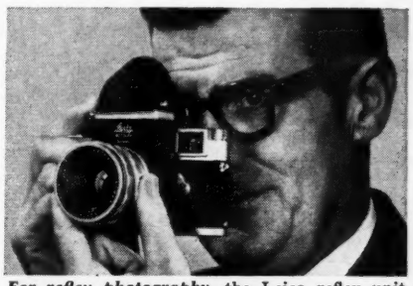
If you're trying to decide between a reflex or a rangefinder camera – and want to enjoy the advantages of both – you should know about this advance by Leica.

On the ground glass of the Leica reflex unit you see an image that is *clearer* than in any other reflex system – it's as if you're looking at a life-like color transparency! It's so easy to focus on a tiny highlight in a person's eye even though his full figure is seen on the ground glass. And the *sharpness* of the



For reflex photography, the Leica reflex unit offers even greater light transmission in through-the-lens viewing, thus permitting faster, easier focusing even under the most adverse lighting conditions. It also features large field, magnified viewing, especially convenient for those who wear glasses.

subjects seen on this exceptionally fine-grain, high-resolution ground glass permits viewing and focusing even under the poorest lighting conditions.

Whether you want to get an extreme close-up of a tiny insect or distant mountain peaks against the horizon *on a full negative size* – the new Leica reflex unit is the perfect answer. And you can use any lens from 65mm to 400mm (90mm – 125mm – 135mm – 200mm). When the superior accuracy of rangefinder focusing is desired, you can use wide-angle lenses like the 21mm, 28mm or 35mm, or when lenses of 50mm, 90mm, or 135mm are called for – the Leica camera has no peer. You can *also* use these same lenses for extreme close-up macrophotography with the reflex unit.

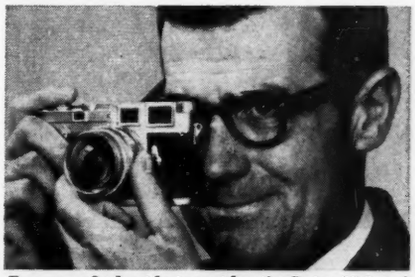
The Leica with the reflex unit enables you to make the fullest use of *all the equipment you own*, offering a number of solutions to the same problem...as well as protecting your investment in your equipment. Virtually any thread-mounted lenses you own (plus a bayonet adapter) can now have unlimited use. With the Leica Visoflex II and the M-2 or M-3 camera, you can now photograph any size subject, from any distance, without owning a whole new set of lenses.

And when it comes to handling this compact, featherweight reflex unit, it fits as snugly to the camera as one would want. It's really a miracle of modern design, using the strongest, lightest, alloy metals and embodying an optical system no reflex camera can match for simplicity in performance.

You can switch from reflex through-the-lens photography to rangefinder shooting in a simple, easy change in only a matter of seconds.

Your local Leica dealer will be glad to show you this unique dual-system of combined reflex and rangefinder photography. And whether you prefer through-the-lens viewing and focusing in single-lens reflex photography with the Visoflex II or the superior focusing accuracy of a rangefinder camera – you can now get both in this new flexible and economical system of photography.

Remember, your Leica dealer is the best photographic friend you can have. He's always willing to give you professional advice on any of your photo-



For rangefinder photography, the Leica M-2 and M-3 have the brightest image of all rangefinder cameras. As a result, they can be focused very rapidly and permit clear, bright viewing at night or indoors where light is extremely dim.

graphic problems without the slightest obligation to you. He'll help you get the most enjoyment out of photography in the most economical way.

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tomatically align photographic paper in a masking frame and to provide it on all four sides with white margins of exactly the same width. This eliminates the necessity of subsequent print trimming.

Masking is accomplished by the use of two separate angle masks, one of which is fixed and the other movable, or by the use of one fixed angle mask and two resiliently movable individual masking pieces. In the latter type the movable masking pieces adapt themselves to the outside dimensions of the sheet of paper.

Exposure Control Device

This is not an exposure meter attachment on a camera but an invention intended to accurately control the length of exposure of a photographic film such as in the case of microfilming documents. The exact title given to *U. S. Patent 2,965,814* is "Method of and Circuit Arrangement for Timing Photographic and Other Processes." The owner is Lumoprint Kindler K. G., Hamburg, Germany.

It is stipulated in the patent that it is for use where the specimens to be successively photographed are maintained at an invariable distance from the camera objective and that the latter has a fixed diaphragm aperture. The internal resistance of a photoelectric cell, used in measuring the brightness of the specimen being photographed, provides the variable impedance in the timer circuit. □

INSTRUMENTATION

continued from page 14

all work to date. This 35mm camera is ideal for field work, and it is easily used in the greenhouse and laboratory. Special fittings attach it easily to the microscope, and ground-glass focusing, that absolute necessity of all microscopic work, is always available. □

TECHNICAL TRENDS

continued from page 57

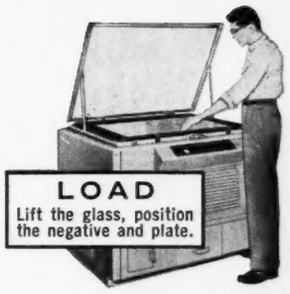
Both projectors are normally fitted with the 90mm *f*/2.5 Colorplan lens, but 150 *f*/2.8 Dimaron or Hektor *f*/2.5 lenses can be used with the addition of an aspheric condenser lens.

Linhof showed an extraordinary range of new accessories, the most eye-catching of which was the new Gigant camera stand for the Kardan-Color camera, in either its 5 x 7 or 8 x 10-inch models. The camera is supported on a counterbalanced arm mounted on a center pillar; this pillar is moved up and down in its housing by an electric motor drive, and the total range of height which the stand gives is from eight inches above the floor level to nine feet above the floor level. Control of the main elevator is by two pushbuttons on a remote control handset, and the drive mechanism is contained within the large base casting, the latter running on three casters with a handwheel for locking the whole assembly in position on the floor.

Among smaller Linhof accessories, there was a new small and extremely efficient Cine Gyro head for movie equipment, giving a range of times from seven seconds to 20 seconds for a full 360-degree pan, a Polaroid back for Technika models, new Super Cutfilm Holders in polyamide for 9 x 12cm and 4 x 5-inch Linhof cameras, a geared focusing slide and stereo head giving a stereo base up to eight inches and a holder for gelatin filters suitable for all Linhof cameras with lenses of front diameter up to 90mm. The holder is designed for gelatin filter foils of 4 x 4-inch dimensions.

For the Cine Rollex system first introduced in 1958, a complete range of accessory equipment is now available, comprising, in addition to the 70mm film back and projector, rewind equipment for loading cassettes from bulk film, a processing tank with transparent plastic spiral and

continued on page 63



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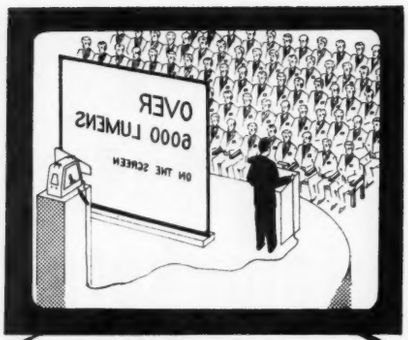

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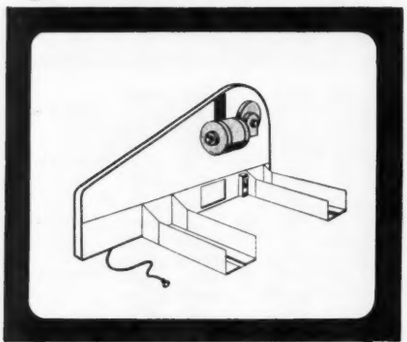

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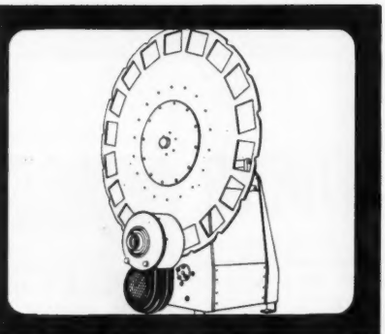

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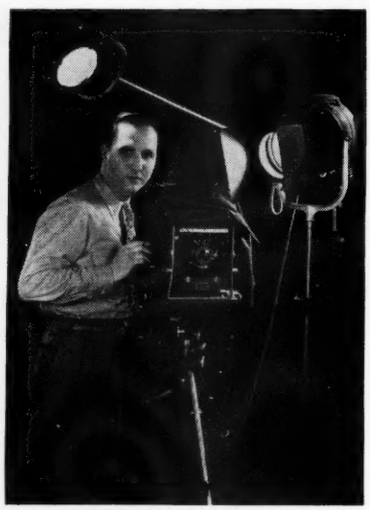
PHOTOGRAPHER IN INDUSTRY:

A Creative Approach

The Crane Company, Chicago, has won many awards for the quality of photography in its plant magazine and product advertising. Much of this is attributable to the work of William W. C. Wilke Jr., who has been on Crane's photography staff since 1936 and its chief photographer since 1948.

Wilke gained national prominence as an industrial photographer in 1941, when he won



WILLIAM W. C. WILKE

first place in the American Society for Testing Material's photographic exhibit. In 1948, he topped that accomplishment by sweeping first, second and third place and honorable mention in the ASTM's major exhibit.

PP of A Master

In 1958 the much-coveted degree of Master of Photography was conferred on Wilke by the Professional Photographers of America, Inc. In conferring the degree on Wilke, L. F. Garcia, president of the PP of A, said, "The diploma and medal are symbols: evidence of the fact that you have received the highest honor which the association and the photographic profession can confer upon you." He was, at that time, only the seventh photographer in history to have received the degree.

Speaking of how he became interested in photography, Wilke said, "When I was looking for a field to work in, I had the desire to do something creative and have the opportunity to express myself. Realizing my shortcomings as an author, poet, painter or composer, I took stock of what my strong points were. Being mechanically inclined and interested in chemistry, I was attracted to the field of industrial photography."

Heights and Depths

At the Crane Company, Wilke has had the opportunity to photograph everything from an entire foundry operation to a single grain of sand. He has been brought in contact with janitors and with the president of the company. He has photographed from heights and he has photographed from depths. He has photographed into things and around them. He has been asked to make little things big and big things little. All in all he has led a varied existence. □

"Underexposed? No, it's a photographic illustration of our company's financial status — in the black!"

TECHNICAL TRENDS

continued from page 61

adaptors for the rewind for loading the spiral.

In addition to the 35mm color reversal film introduced in 1958, Perutz showed transparencies made on this Ektachrome-type material in 127 and 120 rollfilm sizes. All three sizes of this film are coded C 18 and have a speed of 50 ASA. A new addition to the range of Perutz color films was an 8mm material of the Kodachrome type and a speed rating of 20 ASA. This film is claimed to be compatible in processing with other materials of this type in the United States market and at this speed rating shares the honors with Ansco Moviechrome.

Zeiss-Ikon displayed a new fully automatic, low profile projector, the Ikomat. The Ikomat offers slide changing by remote control, both forward and backward, together with lens focusing by remote control. Lens focusing is accomplished by means of a separator motor in the projector, controlled by a sliding key on the handset.

The lens fitted to the Ikomat is a 100mm *f*/2.5 Diatar, which covers both 24 x 36mm transparencies and 4 x 4 Super Slides without change of the condensers. Alternative projection lenses from 85mm to 150mm are available and illumination is provided by either 300 or 500-watt pin-base lamps. Slides are pre-warmed before projection to prevent popping out of focus. □

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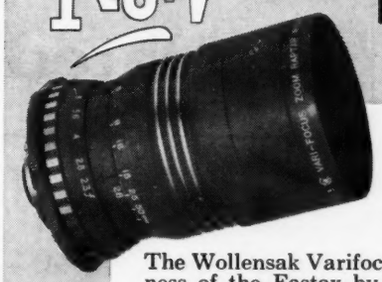

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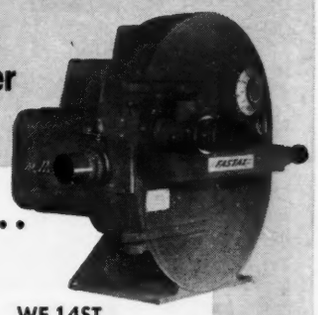

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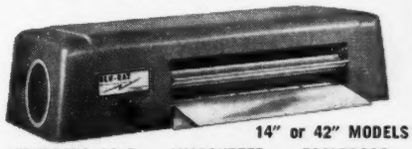

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related reading

1961 Audio-Visual Equipment Directory

National Audio-Visual Association, Inc., Fairfax, Va.,

This is the seventh edition of the standard guide to current models of audio-visual equipment. More than 800 current models of projectors, recorders, etc. are described. It is profusely illustrated with over 650 large detailed photographs. Plastic bound to open flat and designed for easy visual reference, it presents all essential information on each item of equipment in condensed, easy-to-understand form. This is the first edition to list educational television receivers, closed-circuit television equipment, teaching machines and classroom radios.

Instrumentation and High-Speed Photography, Volume I, Series II

Society of Motion Picture and Television Engineers, New York, 187 pp., $4.00.

This compilation of papers reprinted from the SMPTE Journal adds to the more than 1,000 pages on the subject published by the Society in Volumes I through VI of the First Series. The new volume begins with a discussion of the design of underwater automatic and controlled cameras and includes a color-illustrated paper on submicrosecond color photography of explosive phenomena. An article on ultra-cold weather photography describes the U.S. Navy's use of still and motion-picture cameras in cold weather and their application on Operation Deepfreeze. Included in a series of papers on missile photography is a discussion of flying camera stations used to obtain attitude, trajectory and documentary data of missiles launched from aircraft at high altitudes.

Other papers in the book are devoted to light sources, optics and visibility studies, cameras and accessories, the properties and uses of cathode ray tubes, television systems in instrumentation, processing and processing machines and applications in military and industrial test programs.

Elements of Photogrammetry

by Wilfred H. Baker, The Ronald Press Company, New York, 199 pp., $5.

The author, professor of civil engineering at West Virginia University, presents the fundamentals of photogrammetry in clear and logical sequence, explaining the planning of a flight mission, the assembly of the photographs and the use of stereoscopic instruments for a metrical analysis of the photographs and for mapping.

Better Bulletin Board Displays

Prepared by J. Preston Lockridge, illustrated by Gerda McMurray, The University of Texas, Austin, Texas, $2.

This expanded and enlarged edition of an earlier publication is the eleventh in the university's Visual Instruction Bureau's series of visualized handbooks. It points out the strengths and weaknesses of bulletin board displays, offers suggestions for the selection and lettering of captions, and lists sources of free and inexpensive materials.

Overhead Projection

by Horace Clay Hartsell and Wilfred L. Veenendaal, Henry Stewart, Inc., Buffalo, N. Y., 77 pp., $2.95.

This new book is a fresh approach to a comprehensive understanding of a vital tool in education. It tells not only how the overhead projector can be used but details specifically its application in conventional methods of demonstration, dramatization, and group discussion.

MOVIE CLINIC

continued from page 16

you can break the music at any convenient point, overlap and cross over from "B" to "C" roll during the overlap. By placing the end of the musical selection at the end of the scene and winding backwards to the overlap, the music tracks will be in precise position for later mixing.

Similarly, end title music can be made to end with the picture by placing the tail of the music roll in the synchronizer opposite the final picture fadeout and rolling back to the start of the music. This end title music can then be "sneaked" in under narrator or dialog, to rise to a climax at the finish of the picture.

By preparing music in two rolls, sound effects can be cut into either roll at a point at which the roll is blank. Frame-for-frame synchronization can be achieved with post-recorded sound effects in this manner.

When the three sound tracks (narration/dialog — "A"; music/effects — "B"; and music/effects — "C") are prepared, one more step completes the job. Roll the "A" roll and workprint picture back to "start." About six feet after "start," cut in one frame of 1000-cycle tone, and make a large punch in the same frame of picture. The "beep" tone will record on the mixed track to be subsequently transferred to the optical printing track. This is a precautionary measure, to be sure proper synchronization is established.

Now you are ready to mix the three tracks. This requires three magnetic dubbers — either yours or the commercial sound studio's — and a mixing console together with a synchronous projector, interlocked to the dubbers. On starting the machines with the "start" marks in proper position, you will head the "beep" simultaneously with a flash on the screen where the picture is punched. You know your picture and sound tracks are in per-

continued on page 68

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SHOPTALK

continued from page 19

and Emory R. Osborn, Central Hudson Gas & Electric Corp., treasurer; (Syracuse) Robert Burrill, Carrier Corp., Chairman; George Tansey, G. E. Co., vice-chairman; Bob Barnes, Crouse Hinds Co., treasurer.

● *News of coordination and cooperation between photographic groups is always welcome. Among the latest such items is an announcement that the Industrial Photographers Association of America (N.Y.-N.J.) and the Long Island Industrial Photographers Association are planning a joint meeting and collaboration on handling the print exhibit at next summer's National Industrial Photographic Conference. Congratulations!*

● The Society of Commercial Photographers of Philadelphia, a group with many industrial members, does a solid job of promoting its members work. The group sets up an annual print competition (this year prints are due by May 9) and awards an engraved certificate to each member who has a print accepted for hanging. The prints accepted are displayed prominently in the windows of a Philadelphia bank and are then available for educational and publicity displays. A large silver trophy is awarded to the top print by the American Museum of Photography.

● *Scientists from all corners of the world will gather for the annual convention of the Society of Photographic Scientists and Engineers, May 22-26, at Binghamton, N. Y. New advances in color and black-and-white photography will highlight the main program. Photography at high speeds and altitudes and in outer space will also be prominent on the agenda.*

● The Annual "Aurora" Awards of the Industrial Photographers of Southern California were recently presented at the Second Annual Installation and Awards Banquet.

The winners of the annual awards were presented with statuette trophies by William Miller, Aerojet-General.

The winners and category of the print awards were: Don Lidikay, Union Pacific Railroad, News and Public Relations; Jim Rayle, Jet Propulsion Laboratory, Scientific and Research; Bill Eastabrook, Grant Studios, Van Nuys, Products; and Hal Sobotker, JPL, Color Division.

● The Professional Photographers of America, Inc., will have 34 U. S. and two Canadian Industrial Division professional photographers as representatives on its National Council, governing body of the PP of A.

Members will serve a two-year term continuing through December 31, 1962, and will serve as liaison officers between the association and affiliated state, regional, and local photographic groups. They will also serve as delegates at the 70th Exposition of Professional Photography and the 9th National Industrial Photographic Conference scheduled for July 29-August 4, 1961 at the Statler Hilton Hotel, New York.

(L-R); Jim Rayle, JPL, Hal Sobotker, JPL; Don Lidikay, Union Pacific Railroad receiving their awards from IPSC president Robert Pace. Missing from the photo is award winner Bill Eastabrook.

MICROFILM CONVENTION

continued from page 21

Westinghouse Electric Corp.

9:40 a.m. — Microfilm's Place in DoD Engineering Data Systems. Col. Earl T. Wiley, Jr., William S. Hutchins, Armed Forces Supply Support Center.

9:55 a.m. — Microfilm System for Missiles. Harry D. Patterson, Army Rocket and Guided Missile Agency.

10:10 a.m. — Industry Looks at the DoD Program. Lester A. Roudebush, General Motors.

10:30 a.m. — DoD EDMS at Work. Panel composed of above speakers in addition to Otis F. Wooley, USAF; Francis R. Borden, U.S. Army Signal Material Support Agency; Parker Daggett, Naval Air Technical Services Facility; Thomas Moran, Sikorsky Aircraft; Joseph T. Simone, Service Bureau Corp.

9-12 a.m. — Alternate Session II, Library-Archival Application of the Microforms. Chairman, Verner W. Clapp, Council on Library Resources, Washington, D. C.

Microforms in a Library of Science and Technology. Herman Henkle, John Crerar Library

Microforms in a Humanities Library. Ben C. Bowman, Newbury Library.

A Survey of Library Reading Machines. James Dugan, Battelle Memorial Institute.

The ALA Committee on Uniform Microfilm Practice. Peter Scott, MIT.

Communication: Engineering Approach to Microforms. Laurence B. Heilprin, Council on Library Resources.

Centralized Recording of Microforms. George Schwegmann, Library of Congress.

The Guide to Microforms in Print. Albert James Diaz, Microcard Foundation.

The Preparation of Scholarly Microfilm. Richard W. Hale, Massachusetts Archivist.

Discussion period.

2-5 p.m. — Session III, Re-

continued on page 69

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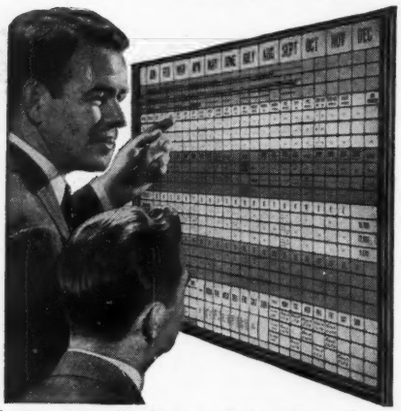

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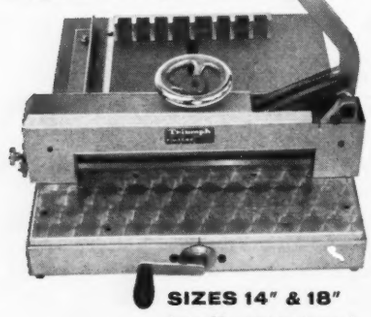

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FILE CONTROL

continued from page 25

reaches an even 10 (i.e., 10, 20, 30) she changed the Kodamatic Indexing dial, moving the code lines on the film up ten digits. In addition, the operator selects one of three exposures on the rotary exposure control for the various colors found in normal correspondence.

Storage and Filing

Upon the completion of 3000 exposures, the film is removed from the Microfilmer and sent in for processing. When returned, the film is stored in plastic magazines only four inches square and housed in a file cabinet which serves as a stand for the Recordak Lodestar Reader used in searching the files.

The corresponding batch of EAM cards is sent to the Tabulating Department where it is sorted alphabetically by the first five letters of the file name. These are stored immediately adjacent to the film file cabinet, one drawer of cards representing each roll of film. Every 28 days, the entire file for that period is returned to the Tabulating Department where the cards are merged into a single alphabetic file for that period.

Reference Procedure

References requests are received by the Communication and Record Services on special requisitions which also act as a label for sending back the copy. The proper tabulating card can be located manually or by machine, and the roll number and sequence number is obtained. The proper film is then placed in the Lodestar Reader, and through the use of a 299 point code on the Kodamatic Indexing of the film the document required can be located in seconds.

A paper copy can be made from the film by exposing a sensitized piece of paper and putting it through a processing device next to the Reader. This disposable copy is returned to the person requesting the copy, and the film and card are returned to their file.

Advantages

The main advantages of the system include less capital expense in eliminating file cabinets and sorting equipment, while not sacrificing look-up time and providing easier handling of searching for documents in the files. Labor saving in microfilming as against filing the original document is also a vital factor in this operation. Also, you never have to return a paper to the file.

The film remains intact and the paper copy which has been sent to the correspondent can be destroyed when he has the information he needs. □

MOVIE CLINIC

continued from page 65

fect "sync." Levels of music, sound effects and voice are controlled at the mixing console; the mixer uses your cue sheet to bring up any of three tracks or fade them out. If the cue sheet is prepared with accurate footage indications as measured on your synchronizer, there should be no problem in bringing in any track at any desired point.

Music levels are partly a matter of personal taste. Generally speaking, they should sound slightly louder with relation to voice than you want the final composite film print to sound. This is because the frequency loss encountered in the transfer to optical sound will occur mostly in the extreme high and low ends of the sound spectrum — in other words, there will be a slight music loss while the voice portion of the frequency range will remain almost constant.

Music can enhance and heighten the emotional impact of your film. Properly prepared sound tracks can "make" the audio portion of the final product. □

MICROFILM CONVENTION

continued from page 67

trieval. Chairman, Richard W. Batchelder, Graphic Microfilm Service.

2 p.m. — A Microfilm Unit Record System: A Case Study. Paul Howerton, Central Intelligence Agency.

2:30 p.m. — Unitizing and Roll Retrieval Systems. George H. Hamp, Navy Management Office.

3 p.m. — The Hard Choice of Hard Copy from Micrographic Systems. Albert W. Dunning, Plastic Coating Corp.

3:30 p.m. — Panel I, Unitizing and Roll Retrieval. Panel composed of Mr. Howerton, Mr. Hamp, in addition to Dr. Marshall R. Hatfield, Minnesota Mining and Manufacturing Co.; Robert Beispel, Microseal Corp.; Leonard Herzig, Prestoseal Manufacturing Corp.; Henry C. Maguire, American Microfilming Service Co.; Mark O'Connor, NB Microjacket; Donald D. Jenkins, Magnavox Co.; R. S. Ellsworth, FMA, Inc.; Henry E. Lemeur, AVCO Corp.; Al Thomas, Recordak Corp.; Bernard S. Benson, Benson-Lehner Corp.

4:15 p.m. — Panel II, Blow Back Methods. Panel composed of Mr. Howerton, Mr. Dunning, in addition to Richard E. Mayberry, Haloid Xerox; Quinton R. Sharp, Charles Bruning; J. H. Smith, Jr., Documat, Inc.; Murray L. Gristle, Griscombe Products Corp.; Dr. T. O. Norris, Keuffel & Esser; D. T. Gerlack and S. V. Boh, A.B. Dick Co.; Dr. D. R. Wolf, Minnesota Mining and Manufacturing Co.; John V. Hogan, Hogan Facsimile; A. L. Baptie, Microcard Corp.; John E. Gerling, Litton Ind.; B. Frank Scherr, AVCO Corp.; Payne Johnson, General Dynamic Electronics; Lawrence G. Kupler, Television Utilities Corp.

Thursday

9-12 a.m. — Session IV, Basic Microfilm Technology. Chair-

NEW PRO-FIXOL

cuts your fixing costs up to 25%

Whatever fixer you now use, new high-speed Pro-Fixol will fix up to 25% more film or paper.

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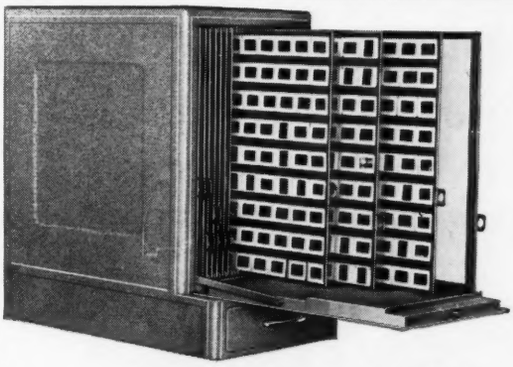

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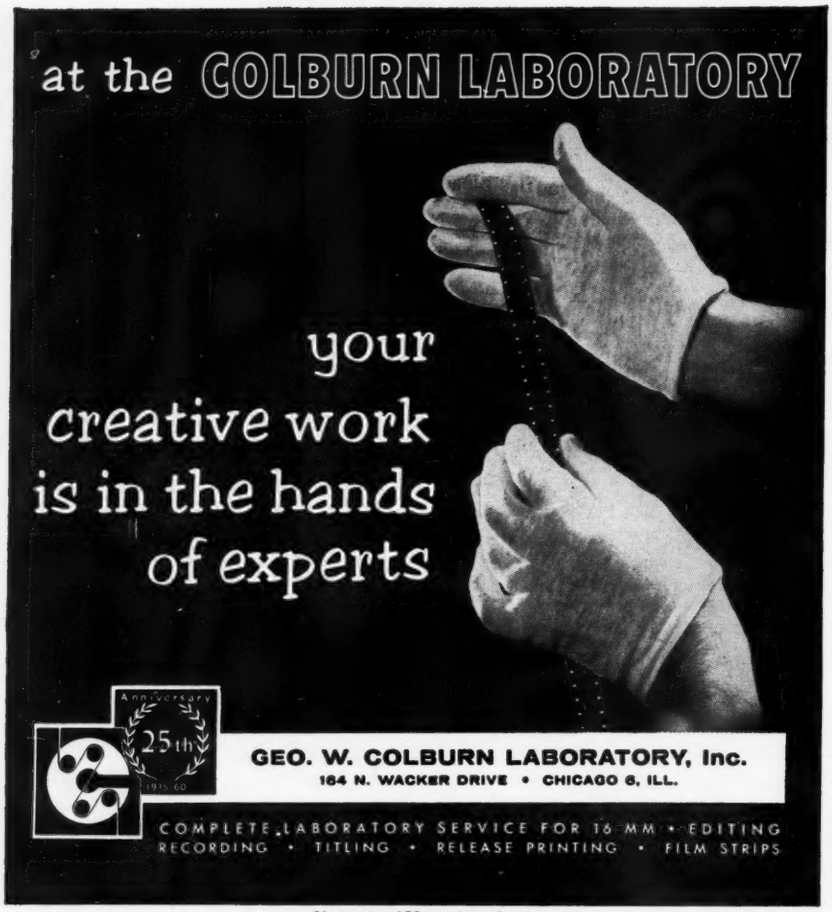
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man, Carl E. Nelson, Bell Telephone Laboratories.

9 a.m. — **Films. The Basis of the Kalvar System of Photography.** Dr. Robert T. Nieset, Tulane University.

Characteristics of Silver Emulsion Films Designed for Microfilm. Dr. W. Allen Burris, Dynacolor Corp.

Recent Improvements in Diazo Microfilm. Harold E. Rubin, Bell Telephone Laboratories.

Panel discussion composed of the above speakers.

10 a.m. — **Fundamentals of Densitometry.** Warren B. Reese, MacBeth Instrument Co.

10:20 a.m. — **Processors and Processing.**

A Technical Evaluation of the Centralized High Capacity Laboratory. Odeen G. Olson, Recordak Laboratories.

The Small Processor. J. Wesley Smith, Philadelphia Air Transportation Co.

Review of Newer Processing Techniques. John Eerde, Mergenthaler Linotype Co.

Panel discussion composed of the above speakers.

11:20 a.m. — **Foreign Developments in the Electrostatic Printing Field.** Dr. Thomas Kucera, Charles Bruning Co.

11:40 a.m. — **Protective Treatments for Microfilms.** Dr. Frederick J. Kolb, Jr. and Edward M. Weigel, Eastman Kodak Co.

Windy City Hosts IAVA Members

Will meet April 25-27.

All roads will lead to Chicago for Industrial Audio-Visual Association members when they convene April 25-27 at the Edgewater Beach Hotel for their annual meeting. Typical of the scheduled talks includes the one by W. V. Hardy of Autonetics who will describe how his company has discovered an interesting use of closed circuit TV.

Robert Colburn Labs will have advice for companies now making 8mm sound films. For those wondering about how to set up a premiere showing of their latest film Robert Strickland of Lockheed will describe the premiere held at the South Pole of his film, *Rendezvous 90°*.

A-V For Sales And Training

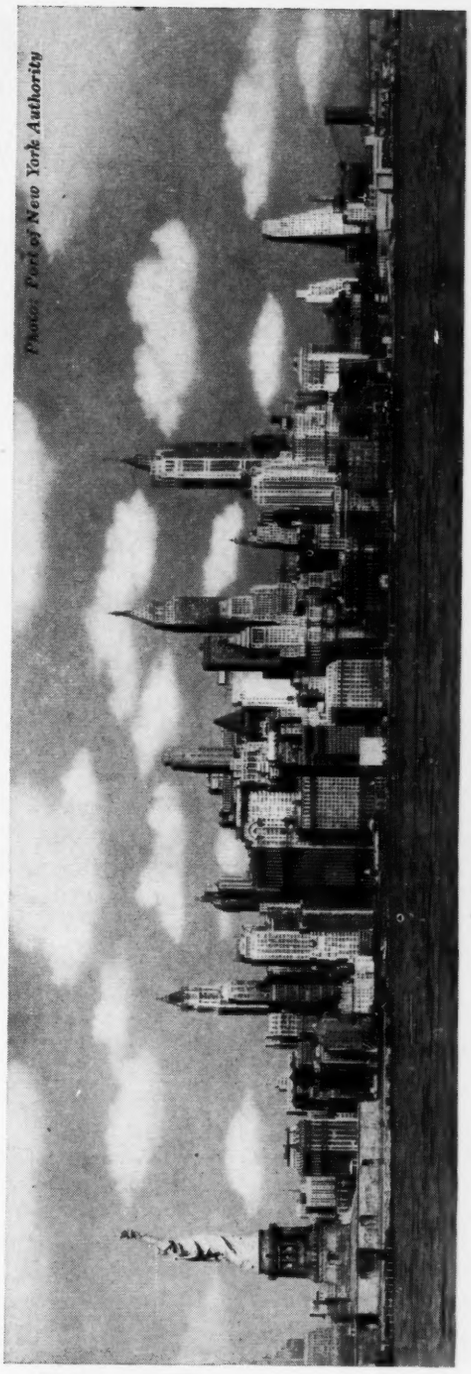
Audio-visuals for sales and training purposes will be discussed by three speakers: Glenn Rohrback of Deere & Co. will tell how a recent dealer meeting in Dallas was made more effective with A-V aids. Mike Ritt of Combined Insurance Company of America will outline a company program which improved the memory of its salesmen. John Ott will describe the use of time study photography in cancer and other research.

Selling an audio-visual program to management will be covered by Bill Pratt of American Telephone and Telegraph. Pratt has been one of the key figures in molding AT&T's A-V department.

Members Will Exchange Ideas

At several sessions members will help each other by exchanging ideas. Mike Ritt will present some "TNT" tapes which will show how to put life and impact into tape presentations. Five-minute "Thumbsketches" moderated by Frank Rollins of E. R. Squibb & Sons will enlighten members on how other members handled their audio-visual problems. At Topical Go-Arounds the floor will be open to questions from the audience.

The IAVA is made up of businessmen who head audio-visual programs in the United States and Canada. Membership is sharply limited to 100 members. At least two meetings are held each year on a national scale. Meetings are also held on a regular basis in five regional sections of the U. S. □



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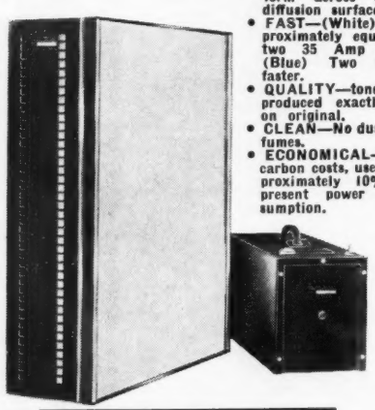

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Dye-Back vs. Non Dye-Back

by ERNEST P. TAUBES

One of the important specifications of Department of Defense Documents MIL-M-9868, "35-mm Requirements for Microfilming of Engineering Drawings," specifies that only dye-back film shall be used for that purpose. The question whether dye-back film has any advantages over non dye-back film has been the subject of considerable controversy in and out of government for a number of years.

Recently, a comprehensive set of experiments was conducted to determine by test whether any advantages are inherent in either of the two film types. These experiments were tailored on similar experiments conducted by the government.

Test Specifications Set

The following test specifications were established:

1. Four different types of microfilm were used.
2. The same camera was used with each type of film.
3. The same document was photographed on each type of film.
4. Each film was processed according to manufacturer's instructions.
5. Each film was examined for resolution and readability on a 60 power microscope. The average reading for resolution was established for each type of film.
6. Each roll of film was cut up into individual images and inserted into aperture cards.
7. The aperture cards were intermixed with every type of film used.
8. The aperture cards were loaded into a Xerox Copyflo machine.
9. The Copyflo machine was set to an average exposure value.
10. A set of enlargements were produced in the Copyflo machine from the intermixed deck of cards.
11. The enlargements were examined by experienced draftsmen to determine whether any differences could be detected between prints and to see whether a Copyflo machine would produce better enlargements from one type of film than from another. Another aim was to find whether a different setting was required for best results for one type of film compared to another.

One of the specifications on the four different types of film, two dye-back and two non dye-back, was that the inherent resolution specified by the manufacturer was approximately equal in every instance.

The following results were obtained:

1. The average resolution of the best film compared with the average resolution of the worst film varied a total of three points. If the best film read 128 lines per millimeter, the worst one read 125 lines per millimeter as an average.
2. No differences were apparent as to camera operation, exposure time on the camera, processing, inspection, collating, trimming and mounting.
3. The results obtained from the Xerox Copyflo were uniform to the extent that none of the experienced draftsmen could distinguish one print from another and classify it as being produced from either dye-back or non dye-back film. This was with the machine at an average setting, no adjustment during printing operations and a completely mixed deck of cards. Similar results were obtained in a DOD test.

In Summation

The following conclusions are apparent:

1. There is no advantage of dye-back film over non dye-back film in normal operations.
2. There is no advantage of dye-back film over non dye-back film in obtaining better resolution.

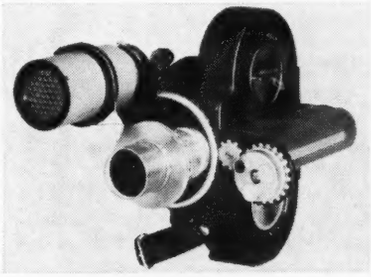
NEW PRODUCTS

continued from page 12

flex Corp. of America. The unit, which has a common tank system, features a unique magnetic bottom drive with quick change racks. Output of the Duplex may be ordered for 90′ 16mm and 12′ 35mm output or 70′/17.5′ output. Other special features include built-in film break controls, standby re-exposure printing lamps and film end detector.

Automatic Exposure Control 106

Flight Research Inc. has available their improved version of the Autex continuous automatic photographic exposure control. Designated the Model VI-4, the unit features a simpler method of matching to the iris



of any lens, internal limit switches, removable photocell for remote locations, and simplified construction and mounting. Normally used for motion picture work, the device will work for all film speeds, shutter openings and frame rates and responds to light level changes as fast as seven stops per second.

Reproduction Lighting 107

Standard, high and ultra-high capacity ColorTran Lighting Systems are now available for the new Robertson 481 camera from *Natural Lighting Corp.* Engineered to "481" specifications, they include features that are said to provide greater operator control, more even copyboard lighting, and as much as double the light intensity where required. The new systems include: Series 500-481, for standard lighting requirements on the 34 x 44″ copyboard, includes 7-lamp LineLites, reflectors, converter, adapters, 150-watt lamps, price: $495; Series 500S-481, for use with 200-watt lamps, includes same basic kit but adds a heavy duty converter and offers 1/3 more light intensity, price: $548; Series 1300-481, for double lighting intensity and use with extra-wide copyboard accessories, offers end and center light arrays that are independently controlled, double 13 LineLites, reflectors, 2 converters, adapters, 150-watt lamps, price: $1,006.90.

continued on next page

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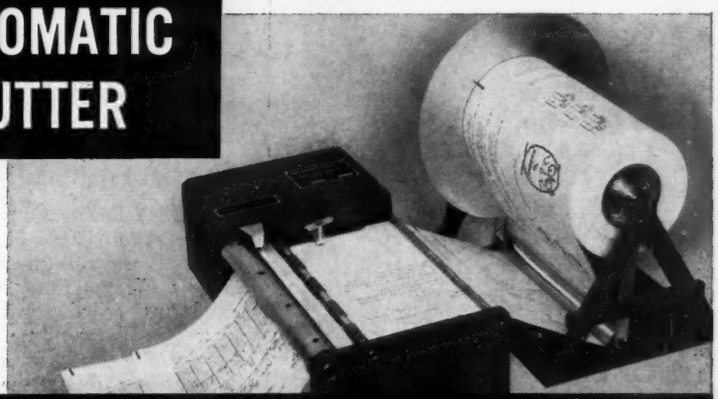

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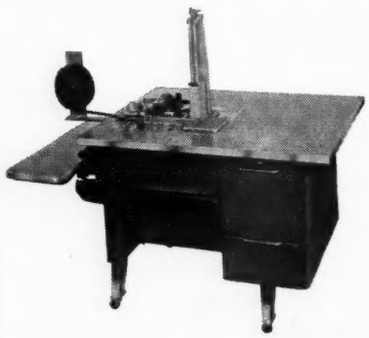
Auto Slide Mounter 108

All popular makes and types of 35mm slide mounts are said to be accommodated in the new S-M Automatic slide mounter introduced by *Seary-Michelbach Corp.* The new design incorporates a high-lift shuttle with deep pockets in the feeding sec-



tion and hold down rails in the heat sealing section of the unit. Said to be the only automatic mounter featuring a conveyor each for inspection and packing, the device stacks same side up in proper sequence and compensates for poorly spaced exposures at operating speed. Capacity, to 120 rolls per hour or more.

Electronic Flash 109

A heavy duty, self contained electronic flash has been introduced by *Photronic Corp. of America* under the name of the Satellite X-90. The one piece unit features an Electronic-Ear monitor circuit which emits a beep when the capacitors are at peak voltage and stops when its drops. Rechargeable nickel cadmium batteries used in the unit are easily removable so that a fresh set may be used for extended picture taking sessions. Each fully charged set gives 125 flashes with an 8 to 13-second recycling time. Built into the Satellite X-90 is an AC line pack and recharger. Power output is 45 watt-seconds but this may be doubled with the addition of a plug-in booster which attaches to the handle. Total weight with batteries is 32 ounces and the specially developed reflector gives a full 60-degree coverage. Price: $75.

Projection Lamp 110

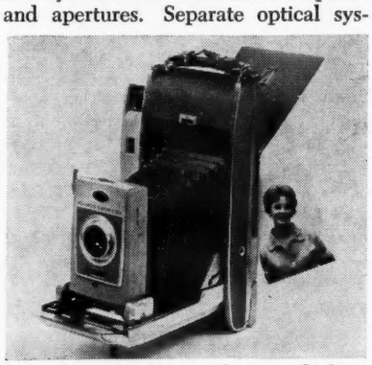
Further refinement of motion picture projection lamps of the built-in reflector type has been announced by *Sylvania Electric Products Inc.* The new lamps, called Sylvania Dichroic Super Tru-Flectors, are said to reduce by 50% the heat from the light that passes through the film. This is accomplished by a special dichroic reflective material coated on a sagged glass reflector. This material permits the infrared to pass through the reflector while the visible light is bounced forward toward the film. Three types are currently available, a DEF, DLS and DLR. The latter is designed for use in 16mm projectors and operates off 21 volts that is supplied through a small transformer.

Interference Free Lens 112

Zoomar Inc., maker of variable focal length and other special purpose lenses, has announced the introduction of the ITV remote control lens which is said to eliminate noise and RF interference. Called the Zoomar Mark-VI, the unit uses a radically new design of DC motor which displays complete freedom from sparking with high electrical efficiency and high initial torque. A miniature commutator made of five white gold wires and spring loaded brushes of the same material assures spark-free contact. In addition, the unit is explosion-proof and has a permanently lubricated gear box.

Automatic Polaroid 111

A lower-priced version of the *Polaroid Land* Electric Eye Camera has been introduced as the Model 850. Like its predecessor, the Model 900, the mercury cell-powered electric eye controls both shutter speeds and apertures. Separate optical sys-



tems for viewing and rangefinding are incorporated along with a thumb controlled rangefinder. Synchronization is provided for regular, electronic and Wink-Light flash. Price: $139.95.

Ultrasonic Projector 113

Complete mobility for lecturers during slide programs is promised with the introduction of a new slide projector by *Bell & Howell.* Called the Tele-Sonic wireless remote slide projector, the unit's focusing and slide changing functions are controlled by a palm-sized device with no batteries or connecting cables. At the press of a switch a 36,500 cps or 40,000 cps signal is generated which is received and amplified at the projector. Slide changes take only 8/10 of a second. Capacity of the machine is 40 slides in special plastic mounts in a dustproof magazine. Illumination is 500 watts and the projector is completely protected during transport by flip down panels. Price: $269.95.

continued on page 76

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PRESTO-SPLICER
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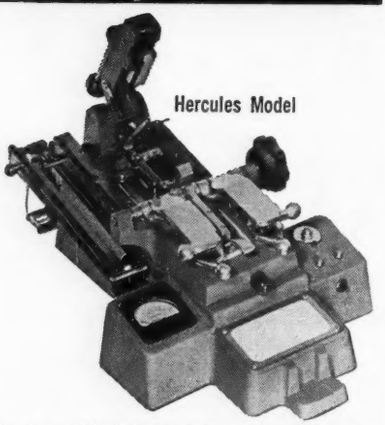
Hercules Model

Newly modified Presto-Splicer butt-welds motion picture film, microfilm, acetate, mylar, Polyester, safety-base, paper . . . or any other kind of tape or film . . . AND INTERMIXES ANY OF THESE MATERIALS making a failure-proof, invisible weld that is literally the strongest part of the tape. Every splice you make will be a cleaner splice . . . a stronger splice . . . a PERMANENT splice, with

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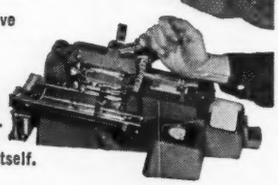
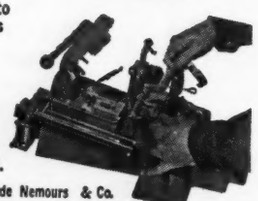
Slide handle toward you as far as it will go. This brings the special Mylar* tape with thermal setting adhesive into position.

Splice in the usual manner. Heat sets the adhesive but does not disarrange the molecular structure of the tape. The bond is permanent, stronger than the film itself.



Use the trimmer to remove the surplus tape. The entire procedure is so simple, so positive, that no special training is needed for your existing personnel.



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NEW PRODUCTS

continued from page 74

Film Registration System 114

Robertson Photo-mechanix Inc. has introduced a "Micro-Pin Register System" which is said to overcome previous difficulties. Designed to position film and screens in the vacuum holder, the system employs round, precision register pins measuring .250" in diameter. These are built into the vacuum holder and can be screwed in and out, from flush mount to .062" above the surface. This permits accurate setting for various thicknesses of films and screen and prevents indents or embossing. A punch for use with the system is also available.

Anti-Static Device 115

Static electricity which is a troublesome factor in dust accumulation is said to be eliminated with the use of the *Simco* Anti-Static Cleaner. The device combines a brush, a shockless static bar and a suction hood. Especially useful for plastic parts, the device is available in any effective length for all sizes of parts and materials. A power unit operating from 110 or 220 volt AC current energizes the shockless static bar.

Color Processor 116

A complete Ektacolor paper processor designed for automatic processing of prints to 20" x 24" has been announced by *Murmatics Inc.* The model C 224 includes the Murmatic V carriage, track assembly, tanks and basket. The carriage controls the transport and immersion of baskets as well as determining the duration and frequency of agitation. Eleven 10-gallon plastic solution compartments are provided with automatic water fittings and drain valves built-in. Overall dimensions are 75" x 30" x 81". Price: $3500.

Litho Film 117

A quality, economical line of films called Powerline has been introduced by *Chemco Photoproducts.* The new products consist of a high contrast emulsion coated on either acetate or dimensionally-stable polystyrene. These are designed to supplement Powerline Transparent Paper which utilizes a specially treated paper base material. Powerline products are available in a variety of cut sheets and rolls.

Copying Machine 118

A photocopier that features a unique type of light source has been announced by the *American Dictating Machine Inc.* The Printess Photocopier uses a rotating, reflecting tubular lamp that is resiliently suspended within a copying cylinder made from opal, dyed-in-grain plexiglass. This system is said to require only one setting for copying work and the light intensity speeds the entire copying process. Price: 9" width, $199.00; 14" width, $299.

Rapid Fire Gun 119

The introduction of AG-1 bulbs has led to a number of new flashgun designs. One of these is the Duo-Lux Quick-Fire flashgun recently introduced by *Walter Voss Inc.* Bulbs are loaded into a small magazine which slides into a slot at the top of the gun. The AG-1s are dropped into place by means of a small lever at the back of the unit and the expended lamps are ejected with the same action. Even light distribution is assured by a pebble-finished polished nickel reflector. Price: $7.95.

Air Cleaner 120

Dark rooms and labs plagued with annoying odors such as those from fixing baths and toners will be interested in an air purification device manufactured by *Roark Industries Inc.* Called Sano-Fresh #17, it employs a layer of activated charcoal through which the odor-laden air is forced. The unit uses less than 20 watts and may be easily transferred from room to room since it weighs about five lbs. Construction is of rugged spun anodized aluminum. Price: $39.95.

Printing Aid 121

Midwest Aerial Photographic Survey Inc. has introduced a color analyzer said to be capable of reading the color balance of a 20X enlargement. Called the Speedmaster, the unit features an expanded scale with three times the readability of similar instruments. Decade controls with click stops permit exact reproducibility from a negative at any future date. Module construction is incorporated which permits easy replacement of any component subject to failure. Price: $695.

Film Dispenser 122

An economical photographic roll dispenser for use in graphic arts has been announced by *Theo. Hommel Inc.* The device can handle a single roll of any width up to 24" or two or more side-by-side totaling 24". The unit is self-contained and cutting is done with a gear-driven rotary knife with a 5" cutting edge.

Chartmaking System 123

Prepared, ready-to-assemble materials for preparation of charts, displays and training exhibits are avail-

able in a complete kit known as the *Duchart* System. Materials include pre-cut, scaled bars and pies, units for making solid, dotted or broken lines, backboards and an assortment of symbols and letters. Another advantage of the ready-made materials is that work done at one division will match charts and displays prepared at another.

High Contrast Paper 124

A high contrast, negative photocopy paper containing chemicals which enable almost instantaneous development at room temperature has been introduced by *Andrews Paper & Chemical Co. Inc.* Named Rollacopy, the material is exposed to the microfilm or drawing negative. Exposure is not critical for the original negative since errors may be corrected in exposure of the positive. The paper is available in grade L5 which may be handled in normal room illumination and grade M5 which is 20X faster and is intended for use in subdued light.

Pump Skimmer 125

Sethco Mfg. Co. is now producing a surface skimmer for solution tanks designed to remove floating particles from large solution tanks. Available in all plastic construction for resistance to corrosive chemicals, the Sethco Skimmer will also simultaneously draw liquid from any depth in the tank. Designed for use with any filter system, the unit easily attaches to a tank by means of a bakelite holder and C clamp.

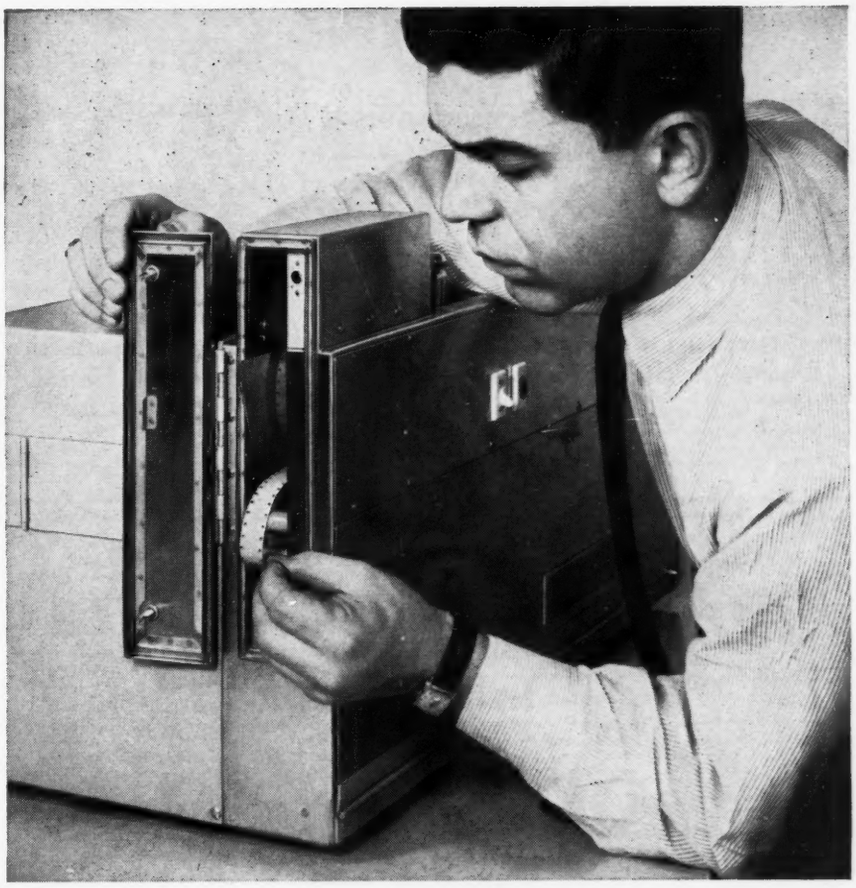
Storage Bottles 127

Squeezable plastic bottles called Flexibots for holding photo solutions have been announced by *Chari-Vari House*. Fitted with airtight plastic caps, they provide safety and economy and prevent contamination from rusted closures. As chemicals are withdrawn, they may be squeezed to remove air to prevent oxidation. The one-gallon size currently offered is available in opaque white. Price: $1.50 ea., 3 for $4.

Reflex Wide Angle 128

In addition to the Porroflex Image Erecting Eyelevel Finder reported on previously, *Caprod Ltd.* has introduced what is claimed to be the first wide angle lens specifically designed for use on a twin-lens reflex camera. The camera is the Mamiya C2 which may be equipped with any one of a series of telephoto lenses and now the wide angle. The new lens, a 65mm *f*/3.5, is provided with a matched viewing lens and is said to be extremely sharp from edge to edge with a minimum of curve distortion.

continued on page 87



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Write for illustrated specifications and prices to Industrial Products Division, Dept. IPD-4, Fairchild Camera and Instrument Corp., 580 Midland Ave., Yonkers, N. Y.

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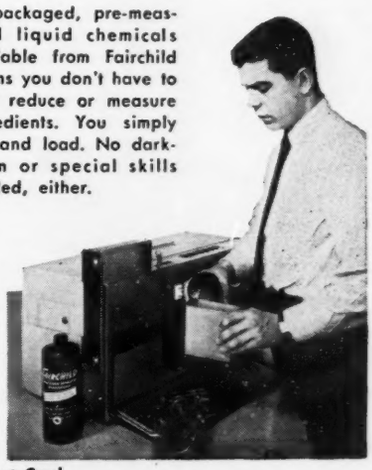

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MICRORECORDING AT WORK

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The name of the Nassau County Department of Photostat in Mineola, N.Y., doesn't tell the whole story. In addition to making nearly 500,000 Photostat copies a year, this department exposes more than 3,500,000 frames of 16 and 35mm microfilm each year.

The department is under the supervision of William F. Ward. Its equipment consists of two 16mm Bell and Howell Model 190E Recorder Cameras; four Model D Kodagraph and two Model D Recordak Cameras; one Model BC No. 22 Houston-Fearless processor and one Bell and Howell Model Bh192A processor; one Model A Recordak enlarger and six film readers.

With this equipment, in 1959 it processed 144,800 feet of film. Of this, 82,100 feet was 35mm and 62,700 feet was 16mm. There was also 52,068 feet of orthochromatic 35mm film used in making positive exposures from some of the negative exposures. These microfilm records were made as a service to 45 other departments or their subdivisions within the county government, from the Surrogate's Court to Meadowbrook Hospital.

Every Deed, Mortgage and Satisfaction of Mortgage received by the County Clerk's office is microfilmed. When you consider that Nassau County's post-war building boom is one of the most stupendous in history, you begin to realize how busy just this one office keeps William Ward's department.

Microfilm has been recognized in the county's laws, one of which requires that the County Treasurer's Tax Record Cards be microfilmed each year. There were approximately 510,000 such cards in 1959. They are on 16mm film at 37 diameters reduction.

Each year the County Treasurer gets from the Receiver of Taxes the Tax Roll Books. There are 368 such books, each comprising about 400 17 x 19-inch pages. These, too, are microfilmed. A positive is made from the negative, with the for-

continued on page 86

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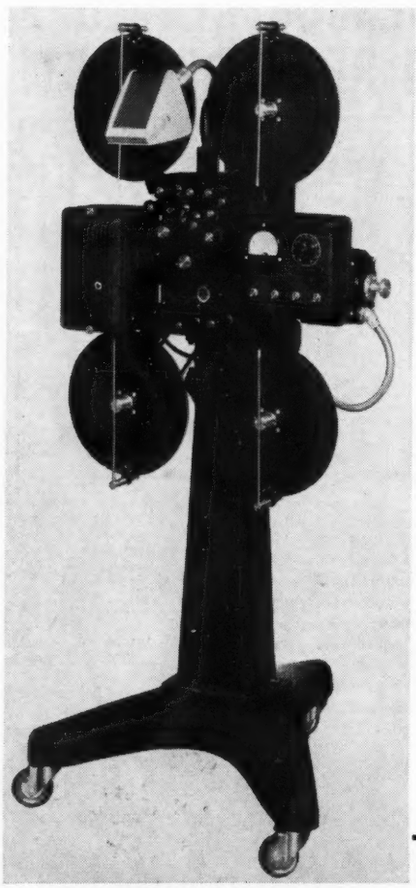

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Copymation, Inc. Folder about the Lancer "Special," a high-speed printer.

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Keuffel & Esser. Information on the 105/35mm Micro-Master camera for automation of engineering drawings.

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Framing Camera 208

Beckman & Whitley. Information on the B & W framing cameras.

Motion Analysis Package 209

Fairchild Camera. "Conserve Valuable Engineering Hours" describes motion analysis camera package.

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Kalvar Corp. Data on the KalFile Add-A-Frame posting system, a unique method of keeping microfilm records and unitizing roll microfilm.

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Speedrol Applicator **216**

Electro-Chemical Products. Data on a new film cleaning device with polyethylene fluid feed cup.

Photo Products **217**

Elkay Photo Products. Literature on darkroom ventilators, tanks, and other photo products.

Film Proofer **218**

Hudson Photographic Industries. Data on film proofer which allows entire roll of film to be printed on one 8 x 10 sheet.

Electronic Color Control **219**

Macbeth Instrument Corp. Data on the EP-1000 QuantaLog, an instrument for visual determination of the "right" color corrections.

Storage Cabinets **220**

Cole Steel Equipment Co. Information about steel storage cabinets for photographs.

Anhydrous Hypo Material **221**

Philip A. Hunt. Learn why this chemical is superior to rice crystals for use in film processing.

Processing Agitation **222**

Lektra Labs. Catalog #60-1 concerns gaseous burst equipment for uniform results in color or black and white.

Table Model Dryer **223**

Simplex Specialty Co. Details on a table model dryer for quality and quantity production.

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Lens Stop Calculator **224**

Natural Lighting Corp. Free lens-stop calculator which shows at a glance lens settings to use when using filters or shooting above or below normal speed.

Film Holders and Repairs **225**

Hoffman Professional Camera Company. Brochure on film holders and repairs, bellows and slides.

Wide-Angle Lens **226**

Burleigh Brooks. Data on Zeiss Distagon 55mm *f*/4 wide-angle lens for Rolleiflex.

Superwide Lens **228**

Buhl Optical Co. Details on superwide lens which cuts throw to a third of usual distance.

Hasselblad Camera **229**

Paillard, Inc. Literature on single lens reflex Hasselblad camera with interchangeable accessories.

35mm Camera **230**

Carl Zeiss, Inc. Literature on the Contarex, a versatile 35mm camera with Planar *f*/2 50mm lens.

Bargain Catalog **232**

Edmund Scientific Co. Catalog AA (128 pp.) shows lenses, war surplus optical instruments, prisms.

Film Holder **233**

Kling Photo Corp. New film holder for 4x5 and Linhof 23 cameras, plus data on Linhof Cine Rollex 70mm system.

35mm Camera **234**

Konica. Information on the new 35mm Konica camera, Model A.

35mm Reflex Camera **235**

Yashica. Info on new Pentamatic with interchangeable lenses, automatic stop-down diaphragm.

Photo Line Catalog **236**

Interstate. New 1961 catalog pictures cameras, lenses, etc. Available.

Precise Camera **237**

E. Leitz, Inc. Description of the Leica M-3, a precise camera which gives complete control over perspective.

FILMS & PAPERS

Printing Papers **238**

Ilford Inc. Flyer on various papers available including Ilford Multigrade.

High Speed Film **239**

Polaroid. Brochure describing new high-speed, 3000 A.S.A. film with 10-second developing time.

VIEWERS, PROJECTORS, SCREENS, SLIDES

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Spindler & Sauppe. Brochure on SL-series Selectroslides and new film strip attachment which converts projector for use with slides and film strips.

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506	525	544	563	582	601	620	640	660	680	700	720
507	526	545	564	583	602	621	641	661	681	701	721
508	527	546	565	584	603	622	642	662	682	702	722
509	528	547	566	585	604	623	643	663	683	703	723
510	529	548	567	586	605	624	644	664	684	704	724
511	530	549	568	587	606	625	645	665	685	705	725
512	531	550	569	588	607	626	646	666	686	706	726
513	532	551	570	589	608	627	647	667	687	707	727
514	533	552	571	590	609	628	648	668	688	708	728
515	534	553	572	591	610	629	649	669	689	709	729
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507	526	545	564	583	602	621	641	661	681	701	721
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509	528	547	566	585	604	623	643	663	683	703	723
510	529	548	567	586	605	624	644	664	684	704	724
511	530	549	568	587	606	625	645	665	685	705	725
512	531	550	569	588	607	626	646	666	686	706	726
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514	533	552	571	590	609	628	648	668	688	708	728
515	534	553	572	591	610	629	649	669	689	709	729
516	535	554	573	592	611	630	650	670	690	710	730
517	536	555	574	593	612	631	651	671	691	711	731
518	537	556	575	594	613	632	652	672	692	712	732
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Rear Projection 241

Genarco, Inc. "Rear Projection of Slides in Large Meetings" explains what rear projection is and shows its advantages.

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Multiplex. Brochure on all-steel slide cabinets which have the right kind of visible filing space.

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Camera Optics. Literature on a compact desktop sales theatre which can be carried in a small attache case.

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Reversal Film Processor 274

Filmline Corp. Data on the Model

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R-15 reversal film processor which develops film at 1200′ per hour.

Laminating Magnetic Tracks 275

Vitatone. Folder describes advantages of laminating magnetic tracks on motion picture films.

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New Photo Booklet 283

National Camera Repair School. "Photography – It's Wonderful" describes new facts about photographic equipment.

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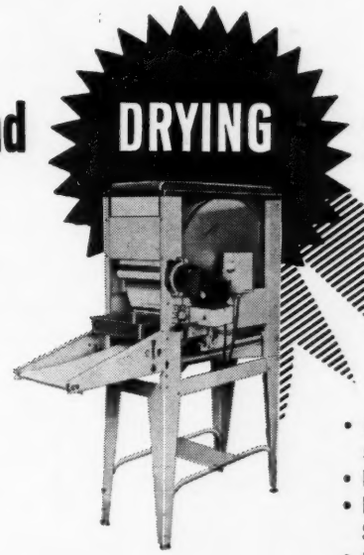

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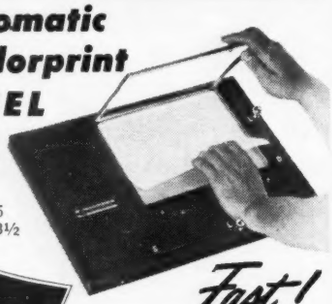

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photo briefs

by JILL ENGLISH, *Associate Editor*

"Flossie, You Look So Natural!"

ONE MANNEQUIN has apparently just taken a picture of her friend with a Polaroid Land camera in a recent display set up at Crowley-Milner's department store in Detroit. The shot was faked by window dressers.

Balloon/Camera Rig Will Catch More Detail in Space Photos

A 4500-pound, 36-inch aperture telescope system, which will be flown to high altitude by balloon to photograph planets, nebulae and other celestial objects, is being constructed for Project Stratoscope II.

The purpose of Project Stratoscope is to loft high performance systems by unmanned balloon to high altitude above nearly all of the atmospheric turbulence and dust that distorts or obscures ground-based observations.

Project Stratoscope is directed by Professor Martin Schwarzschild of Princeton University. The program is sponsored by the Office of Naval Research and the National Science Foundation, with additional support by the National Aeronautics and Space Administration. The complete 36-inch Stratoscope II telescope is being designed and built by the Perkin-Elmer Corporation, which also built the optical system and camera for the Stratoscope I telescope system.

The telescope's primary mirror will be a 36-inch aperture, *f*/4 parabaloid. It will have a theoretical resolving power of 1/10

second of arc — equivalent to the ability to distinguish two objects 15 inches apart 500 miles away.

The 400-pound primary mirror is fused silica, with its surface polished to an accuracy of 1/1,000,000th of an inch by Perkin-Elmer opticians. The secondary optical system, which relays and magnifies the image onto the photographic focal plane, will provide an effective focal length of 300 feet. Film used will be 70mm wide.

P.I.P. Phenomenon Useful In Infrared Photography

New York University physicists engaged in studying the properties of photoconductive materials have discovered that a phenomenon known to scientists as "persistent internal polarization" (P.I.P.) has important potential practical applications in scientific photography.

Investigation during the past four years by Dr. Hartmut P. Kallman, director of NYU's solid state laboratory, and Dr. J. Rennert, senior scientist, has disclosed that certain phosphorescent materials can be "loaded" with electrical energy for storage until released by exposure to radiation. This stored energy can also be released by light.

For example, information such as printed words or pictures can be conveyed by a light beam onto a phosphor plate, where it is stored invisibly like the latent image on an exposed photographic film before developing.

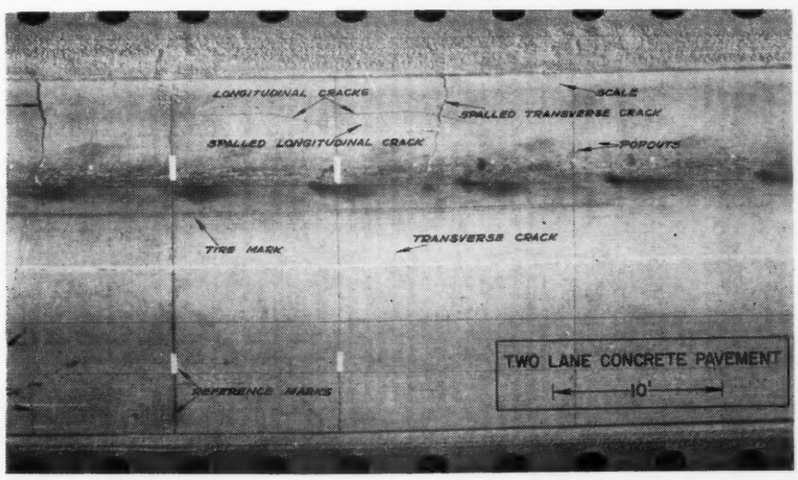
This phenomenon occurs when luminescent materials, such as those used in TV tubes and luminescent dials, are exposed to radiation in the form of ultra-violet rays, infra-red rays, gamma rays, or electrons.

A P.I.P. plate can be used for photography even after exposure to radiation from an atomic blast that would permanently fog ordinary photographic film.

Used in infrared photography, it widens the range of sensitivity from 1.3 microns, which is about the limit at present in ordinary infrared photography, to 2.5 microns, as demonstrated in the NYU laboratory. The potential range may extend to even longer wave lengths, the scientists say.

P.I.P. can be applied in a dry copying photographic process, as in the photocopying machines used to reproduce documents and photos in business offices. It is safer for the operator than present methods because less electrical power is necessary for "copying" the original material. It is also simpler to handle, because no special conditions of humidity or temperature are required.

Recording A Highway's Bruises



UNRETOUCHED PHOTO (except for annotations) shows an enlarged portion of 35mm strip film record obtained by the Aero Service Corp. when it conducted a highway aerial survey at night. Several methods may be used to position and identify the film record, including marks on the highway.

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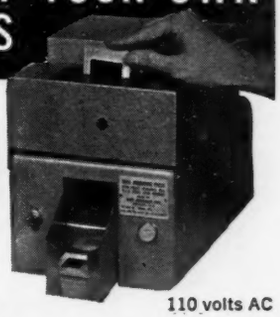

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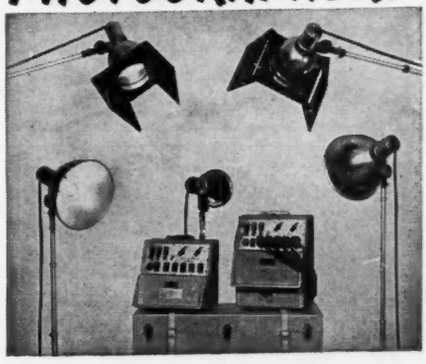

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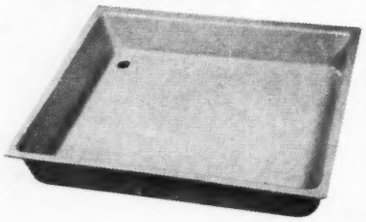

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MICRORECORDING AT WORK

continued from page 78

mer being made available for general use and the latter permanently filed.

Nassau County's microfilming began in 1939. It is desirable to have older records on microfilm, also, so the Photostat Department's program calls for each year copying an old year's record as well as those for the current year.

In the case of most of the records described, microfilming means that the original paper documents can be destroyed. And that means considerable space savings. The case of Meadowbrook Hospital dramatically illustrates this particular benefit derived from the Nassau County microfilming program.

In the course of a survey, Superintendent Ward found that there were seven storerooms in the hospital filled with patients' medical records, all in extremely poor condition. Since regulations required that most of these records must be kept, the prospect was that the seven rooms would soon become eight unless the records were put on microfilm.

Sixteen millimeter was chosen as the medium for this continuing project. Film is cut up by cases and each case goes in a separate 8 x 5-inch acetate jacket, whether it contains five or 100 pages. There are six rows to a jacket, with room for 16 frames in each row. The first row contains the case number (three frames), the title page and 12 pages of the case. Should a case contain more than 92 pages, another jacket is used.

In 1959 there were 1,038,195 exposures on this project and they were inserted in 51,225 acetate jackets. A roll of film that is exposed on Monday is jacketed and back in the hospital on Wednesday morning.

William Ward and his staff are doing a varied and interesting job, as well as one that is a credit to the microfilm method of preserving records. □

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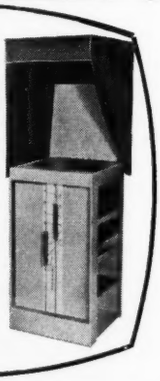

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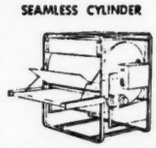

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NEW PRODUCTS

continued from page 77

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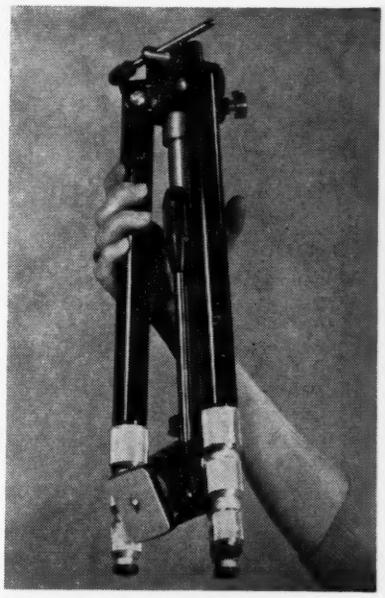
Roll Holder 132

Uninterrupted shooting sessions and extended sequence series are some of the advantages of a 70mm film holder designed for Linhof 23 and most 4 x 5 cameras by *Kling Photo Corp.* Called the Cine Rollex 70mm film holder, the unit takes reusable cartridges which are similar to 35mm cartridges and permit taking up to 53 exposures each measuring 2½" x 2¾". Film is advanced by means of a single-throw rapid transport lever which also actuates an automatic exposure counter. Since no paper leader is used with 70mm perforated films, loading may be done from bulk rolls, and equipment for this is also available. Other accessories such as a one-gallon tank with spiral reel can be obtained.

Professional Tripod 131

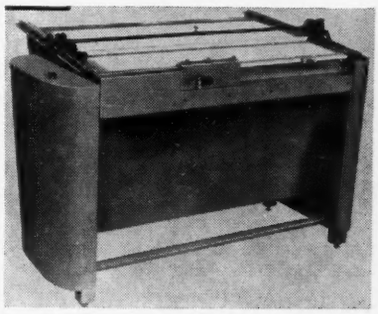
Joining the line of Super Quick-Set professional tripods is the Lo-Boy which measures only 16" when collapsed. Retaining the construction features of other *Quickset* tripods, the Lo-Boy has an invertible center column which permits the photographer to stow the unit in any press



bag. Four section legs plus the extended center post give a height of 56½". Weight of the tripod is 3.9 lbs. Price: $36.

Step and Repeat Machine 134

The *Bar-Plate Mfg. Co.* has introduced its Ultimatic Step and Repeat Machine designed for use where precise repetition of images is necessary. The unit will take one image and step

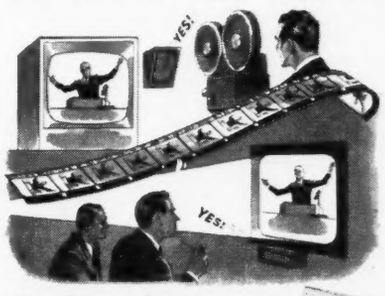


it accurately to a tolerance of plus or minus .0005" and then repeat the image if necessary to the same accuracy. Any sensitive surface such as film, plastic, glass or non-ferrous metals may be used on the device.

Electric Eye Projector 135

The application of electric eye technology to still and motion picture cameras has made picture taking, in most instances, an almost automatic operation. Now *Sawyers, Inc.* has produced a slide projector incorporating an electric eye controlling mechanism that "reads" each slide for density and automatically contracts or expands a four-blade diaphragm. Although serious over- or underexposures cannot be corrected this way, smoother presentations will result.

BACH AURICON
16MM SOUND-ON-FILM EQUIPMENT
VFR
VIDEO FILM RECORDING
WITH "TV-T" TELEVISION TRANSCRIPTION SHUTTER
(BACH AURICON U. S. PATENT 2,677,012)
...the practical, low-cost method of recording closed-circuit TV picture and sound for future reference!



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BACH Auricon®
BACH AURICON, Inc.
6914 Romaine St., Hollywood 38, Calif.
ELECTRONIC-OPTICAL EQUIPMENT SINCE 1931

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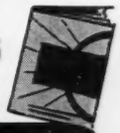
NOW A CONSISTENT Light Source!
SLAVE OPERATED with Modeling Light!

Try The NEW HERSHEY Model M
HI-PRO
ELECTRONIC FLASH
See Your Lighting BEFORE You Shoot With HI-PRO'S Exclusive Modeling Light!
Powerful, Portable *150 watt-seconds!* Effective, *CONSISTENT* Slave-Operation, Photo-Tripped (eliminates those extra cords). See your local dealer! Set up your *own studio trial!*
Suggested Retail Price $109.95
FREE "Hi-Pro Hi-Lights" Booklet has all the facts . . . write



Hershey MFG. CO.
853 DUNDEE AVE., ELGIN, ILLINOIS
MAnsfield 6-3700

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NOW AVAILABLE!
35mm BLACK & WHITE
SLIDES
From any size photo or negative
6¢ per frame from complete 35mm roll unmounted.
12¢ mounted
30¢ each from negatives larger than 35mm
50¢ from photos
We can make slides from photographs, negatives, charts, graphs, books, etc. Complete price list of special services, including developing of black & white and color film, duplicating 8 & 16mm film, reducing and enlarging 8 & 16mm film, available on request. Write today to
NATIONAL PHOTO LABS NEW HYDE PARK 31, N.Y.

Circle No. 566 on Post Card

Beautiful 35MM COLOR SLIDE DUPLICATES
Art Gallery Quality COLOR SLIDE COPIES
MADE FROM ANY POSITIVE TRANSPARENCY FROM 35MM. to 4" x 5". 9½¢ EACH IN RUNS OF 12 OR MORE OF A SCENE
SHORT RUN SLIGHTLY HIGHER
WRITE FOR FREE SAMPLES AND FREE TEST RUN OFFER
WORLD IN COLOR PRODUCTIONS
BOX 392-I • ELMIRA, NEW YORK

Circle No. 591 on Post Card

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51 to 100 feet — 20 cents per foot
101 to 250 feet — 16 cents per foot
251 to 500 feet — 12 cents per foot
501 to 999 feet — 10 cents per foot
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Footage refers to prints from identical negatives.

Similar sensational prices for 2 X 2 color slide duplicates.
Fast Service and excellent quality.

United Movie Technicians, Inc.
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Circle No. 558 on Post Card

First transistorized
COLOR ANALYZER
by photochron

- For precise analysis of black & white or color negatives and positives
- Transistorized circuitry provides high sensitivity
- Portable. Battery or AC operated
- Simple to use for quality color printing

Light box available for off-easel use

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From Artwork or Transparencies
Black & White or Color
FAST SERVICE
Also Record Pressings or Tapes
35mm color duplicate slides
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COLOR EQUIPMENT
MFG. BY SPECIALISTS FOR TYPE "C" AND ALL COLOR PROCESSING, ALSO GAS AGITATION, REPLENISHMENT & FILTERING — BOTH MANUAL AND AUTOMATIC.
BERNALEN NI 9-1333
490 ATKINS AVE. BKLYN. 8, NEW YORK

Circle No. 511 on Post Card

Two models are currently available, the 500-EE full remote machine, and the 500-EE-T which has an additional automatic timing feature.

Solution Filter 136

A filter cartridge made of custom-manufactured synthetic fiber felts of controlled denier has been announced by the *American Felt Co.* Called the AFCO Feutron Filter Cartridge, it is designed to serve as a filtration medium for photographic solutions. The cartridge which fits most standard canisters uses the "edgewise" principle of filtration.

Motion Detector 137

A simple, reliable and extremely low-cost device for detecting motion or the lack of it has been developed by *Gaylord Products, Inc.* Designed to sense rotary movements as slight as ½ r.p.m., the device will have applications in the instrumentation field and in telescopic tracking mounts. Completely enclosed in a nylon housing, the Gaylord Motion Detector is approximately 2½" in height and weighs only a few ounces. Operation is virtually friction-free and no maintenance is required.

Desk-Top Microfilmer 138

A flow type microfilm camera, said to be the lowest priced and most compact unit ever designed, has been announced by *Microdealers, Inc.* The 16mm camera when operated as a

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Industrial Photography • *April, 1961*

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All Classified Advertising payable in advance.

SITUATIONS WANTED: 15¢ per word. ALL OTHER CLASSIFICATIONS: 25¢ per word. BOLD FACE CAPS 30¢ per word. DISPLAY RATES: $25.00 per inch.

Each word, including each item in the address, counts as one word. Box number counts as 5 words. Cash with order. Closing date 5th of month preceding date of issue... DISCOUNT 10%—3 consecutive insertions

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PHOTOGRAPHER. Any location considered. Eight years experience Cine. and Stills. Recently completed thirty minute national TV 16mm Color Sound. Public Relations, Engineering and Documentary Films. Editing qualifications — complete resume on request. Age — 28. Box 220, Industrial Photography, 10 East 40th St., New York 16, N.Y.

Do you want photographic services combining versatility, efficiency, creativity — from action and aerials to photomicrographs and products — utilizing 35mm and 4 x 5 black-and-white and color with $6000 equipment including a complete Leica system, a 4 x 5 view camera outfit, studio and portable lighting, and printing, mounting, and display equipment? Expert in reproduction and Fairchild engraving process, slide film producer, and movie beginner. Now employed, available one month notice. Publication photographer 8 years, exhibitor, teacher, writer, college degree. Resume', portfolio, and references furnished. Box 225, Industrial Photography, 10 East 40th Street, New York 16, N. Y.

Employed Cameraman and laboratory technician seeking relocation with progressive producer. Military, educational and Federal agency experience. Request resume. Box 226, Industrial Photography, 10 East 40th Street, New York 16, N. Y.

Master of Fine Arts degree graduating this June with a major in photography from Ohio University. Military completed. Pilot's license. Box 223, Industrial Photography, 10 East 40th St., New York 16, N. Y.

MISCELLANEOUS

QUALITY EKTACOLOR "C" PRINTS. Industrial and commercial print specialists. Request prices. Corona Color, 70 West 46, New York 36.

16 MM PROCESSING, PRINTING, RECORDING. Open 7 days weekly. Write for price list. Johnson Tele-Visuals — Box 809 Denver 1, Colo.

VIEWERS

New promotional line, collapsible slide and filmstrip viewers. Films duplicated. Free sample. Stereo-Magniscope, Inc., 40-31A 81st Street, Elmhurst 73, N. Y.

CONTACT SCREENS

The Universal*, a new, improved gray contact screen, shoots faster, gives more contrast if desired and better tone values.
Rulings: 32, 45, 55, 60, 65, 75, 85, 100, 110, 120, 133, 150, 175, 200, 250.
Sizes: 8 x 10 to 23 x 29 In. *Trademark
Pre-angled screens to 23 x 29 in. at same prices.
Write for price list and descriptive folder
CAPROCK DEVELOPMENTS
165 Broadway, New York 6, N.Y. REctor 2-4028

HELP WANTED

We have an opening for a creative man who thinks in visual terms. Knowledge of photography and experience in script-writing and dramatic arts desirable. Administrative position assisting in motion picture and visual aids production. Prefer man with two to five years experience. Excellent advancement opportunity. Paul M. Aldrich, Employment Supervisor, Personnel Dept. (Film) AEtna Life Companies, Hartford, Connecticut.

FOR SALE

16/35MM MOVIE, MICROFILM PROCESSING for Space Programs, Instrumentation, Rocketry, Identification Services, Sports, TV Stations, Hospitals and Education. BRIDGAMATIC machines do Reversal, Negative/Positive, Color, automatically. $1241.00 up. SOS, 602 W. 52, New York 19, Dept. RC.

PACO PRINT WASHER, 18" x 26" tumbler. PACO ECONOMY ELECTRIC PRINT DRYER, 30" x 26" drum, 2250 watts. EASTMAN AUTOFOCUS ENLARGER 5 by 7 Model D, F 4.5 lens. Advertising Department, Iron Fireman, Cleveland 11, Ohio.

SALTZMAN ENLARGER 5-7, PERFECT, LIST AT $1000.00. SELLING FOR $375.00 LESS LENS. BUYER MUST PICK UP. LESLIE CROCKER, 24 BROOKWOOD DRIVE, MAPLEWOOD, N. J.

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For the finest in portrait negative retouching send your negative to the Enterprise Retouchers 13625 Leroy Ave., Cleve. 35, Ohio. Tel CL 2-3387.

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KODAK FERROTYPE POLISH Case 30 pints	$7.50
FILM HANGER RACK — 24" long holds up to 14 x 17" hangers — new	4.50
MICROFILM PROJECTOR — 75w. for 16mm & 35mm 100 ft. rolls with case	49.50
STAINLESS STEEL TANKS 12 gal. 13 x 6 x 47" — new —	42.50
B & H GAUGES FOR FILMO REPAIR S-4163-N1 Aperture alignments	140.00
S-3972-N1 Shuttle Teeth	30.00
BLADE & HANDLE — for ingento trimmer — 18" — new —	3.00
AIRCRAFT CAMERA K-38, 24" Bausch & LOMB f6 Aero Tessar, motor, used	45.00
B & H EYEMO 71-k — 35mm newsreel movie camera—2" lens, Deluxe case, used	119.50
AIRCRAFT CAMERA — K-24, 7" Kodak aero-Ektar, motor, magazine, used	67.50

SATISFACTION GUARANTEED OR MONEY BACK
ALL PRICES FOB NEW YORK
WRITE FOR COMPLETE BARGAIN BULLETIN
INTERCINEMA CORP., BOX 3452, N.Y. 17, N.Y.

"168 rolls — 100 ft. 928A DuPont 'Superior' 4-16MM Negative Film—wound emulsion side in—perforated two sides for Fastax Camera". Chamberlain Cord, Waterloo, Iowa.

desk unit will record letter-size documents, which are inserted through a slot in the front and are returned through a lower slot. The PDC Microfilmer may also be operated as a motorless skimming camera for recording maps, newspapers and other outsize material, including bound books. Other features of the P.D.C. include synchronized film and document motion, a length of only 13½" and a total weight with motor of seven lbs. A rear projection viewer is also available for readout.

Cine Telephotos 139

A complete set of telephoto lenses for motion picture and still cameramen is being distributed by *Birns & Sawyer Cine Equipment Co.* Called Omnitars, the system includes 12 focal lengths ranging from 125mm through 2000mm. These are available in a variety of mounts to fit 28 different cameras. Rounding out the lens system are monocular Omniscopes used as tracking finders and lens-to-camera support cradles. The scopes have hairline reticles engraved to show film fields.

Africa's Buses Screen Ads on Projectors

Small advertising screens fitted with automatic "back projection" slide projectors are soon to be installed in buses of Pretoria, South Africa. The projector, fitted behind the driver's seat, switches on automatically with the bus ignition and projects 20 35mm slides, each slide being shown 10 seconds.

Coming Next Month
Industrial Film And A-V Annual

Quick, low-cost protection with Kimac Protectors

Skin-tight, sealed, square-fold Kodapak sleeves. Prevent scratches, finger prints, abrasion, frayed edges and 'popping'. Fit all viewers and projectors stereo. Give dealers name.
FREE SAMPLE. Specify size: 2 x 2, 2¾ x 2¾ or
KIMAC, Box II-115
Old Greenwich, Conn.

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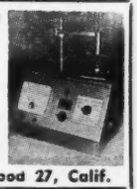
Mills PET Photographic Equipment Tester



Reveals true condition of equipment . . . assures proper exposure
THE MILLS PHOTOGRAPHIC ENGINEERING LABORATORY
1857 N. Western Avenue, Hollywood 27, Calif.

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Webster Photocolors
The ORIGINAL Invisible Spotting Colors

The perfect medium for invisible retouching and spotting of **EKTACOLOR** and **PRINTON** Color Prints. For free Color Chart, latest information, and price list, write (on your letterhead, please) to **Webster Brothers Laboratory, Dept. I, 2049 W. Chase Ave., Chicago 45, Ill.**

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9th

INDUSTRIAL PHOTOGRAPHIC CONFERENCE

JULY 30—AUGUST 4, 1961

STATLER HILTON HOTEL
NEW YORK CITY

sponsored by
PROFESSIONAL PHOTOGRAPHERS OF AMERICA, INC.
152 W. Wisconsin Ave., Milwaukee 3, Wis.

250 A.S.A. METER COLOR NEGATIVE

- WILL PRINT ON ANY **BLACK** & WHITE PAPER
- **Save your Co. Thousands of $$$ by using the Hauser Color Negative System.**
- **1 negative will give you; a color print, a color transparency or a black & white print on ANY PAPER.**
- **This film is pretested for this method by the Hauser Color Lab. The film is sold by the Hauser Color Lab Inc., with the processing included.**
- **All film prices include processing.**
- **Sheet 160 ASR. Meter**

1 — 120 roll* $2.25
10 — 4 x 5 sheets $14.00
10 — 8 x 10 sheets $40.00
"It's the same price you would pay for Ektacolor"
all film purchase orders must be prepaid

INDUSTRIAL COLOR PRINT PRICE LIST *

1st 5 x 7 or 8 x 10 $7.50 ($2.50 credit for gray card). Quantity prints down to $1.50. 11 x 14— $12.50, 16 x 20 — $17.50.
PRINTS UP TO 40" x 120" on request

48 HOUR SERVICE

SEND $5.00 FOR:
1 Sample roll, (including processing), price list, instruction, gray card, and 2 of our sample prints.

HAUSER COLOR LAB INC.

1466 So. 92nd Street, Milwaukee 14, Wisconsin
**see complete price list*

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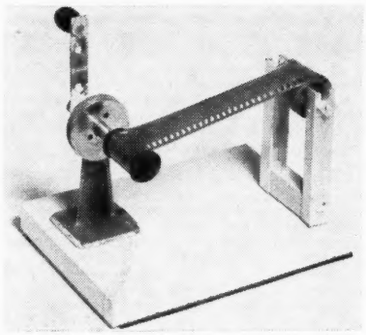
short cuts
to save time and money

NO-COST FILM WINDER

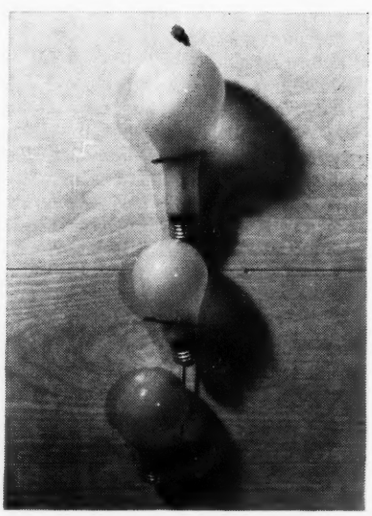


An efficient 35mm film winder for darkroom use can be made from an old pencil sharpener, two pieces of channel aluminum, a bolt and a piece of scrap wood. Slot the sharpener axle to take the film spool, and slot the aluminum standards to hold the supply spool axle. — *Hank Tenny, Dallas, Texas.*

RETARDS OXIDATION

Wax paper floated on the top of developer and fixer solutions in tanks eliminates the need for transferring the solutions to bottles after their use in order to preserve them from oxidation and evaporation. The pieces of wax paper are cut oversize, floated on the surface of the solution as is shown in the photograph, and air bubbles caught between the paper and the surface of the solution are run out to the sides and allowed to escape before the paper is pressed lightly to the sides of the tank — *William C. Diffenderfer, Miami, Florida.*

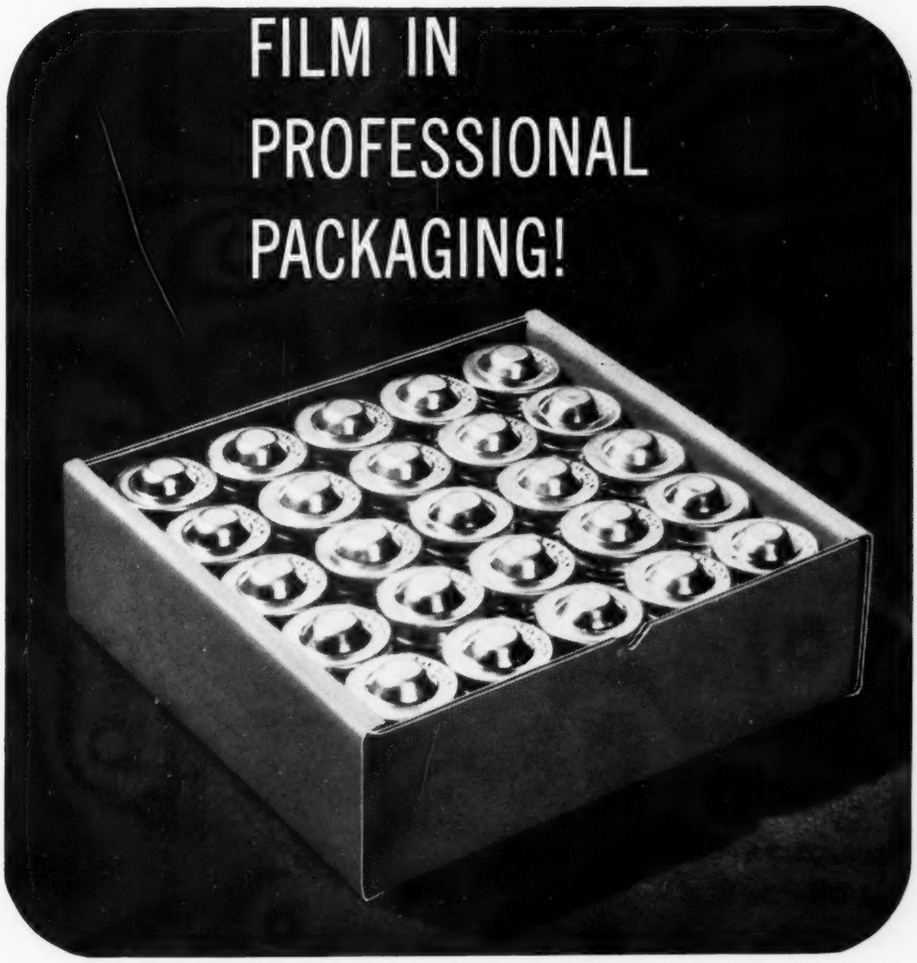
BULB HOLDER



Since the photographer needs plenty of extra light bulbs, he can always use a method of hanging the bulbs where they will be handy. By using a pair of pliers to shape a coat hanger wire, you can build a simple bulb holder that can be hung wherever needed. It can be tacked on the wall in the camera room to hold extra photofloods, in the darkroom for extra bulbs for the enlarger, safelights and printers, as well as the normal household bulbs that are constantly used. — *Wayne Floyd, Fayetteville, Tenn.*

NEW FROM ANSCO!

PROFESSIONAL FILM IN PROFESSIONAL PACKAGING!



No more starting jobs on one emulsion number and finishing on another. No more opening film cartons one at a time. No more separate rolls scattered throughout your camera bag. And no more searching for convenient mailing cartons to ship film back to home base. Ansco's new Professional Packaging combines the best of everything for the busy, hard working professional who wants his film in a convenient form. Both **Super Hypan®** and **Anscochrome®** 120 and 35mm films are available in 25-roll cartons. The 35mm loads are of course, 36 exposures each . . . just right for the prolific pro. Both the 120 and 35mm films are frame numbered for easy identification. And each package contains only one emulsion number. A real boon when top uniformity is required.

The Professional Packaging cartons are light and extremely strong . . . perfect for re-use as mailers or for film storage.

New Professional Packaging from Ansco was designed with the pro in mind. Increases efficiency while saving time and mess. Make sense? Ansco, Binghamton, New York, A Division of General Aniline & Film Corporation.

Ansco

Professional Packaging

Circle No. 504 on Post Card

Kodak
TRADEMARK

This projector may change your way of working

The 8mm motion picture switched from an amateur's hobby to a professional's tool when this Kodak Sound 8 Projector was introduced. It may well change the way you do *your* work.

For here is a projector that makes it possible to present your own 8mm in-plant movies with your own magnetic sound, at a new, low cost.

This machine brings you sound and picture quality comparable with much 16mm, enabling you to make and show good color-sound movies with savings only 8mm equipment and materials can provide.

Speaker, microphone, and the projector itself are all included in the case. You can set it up and thread it in seconds. It has two forward speeds (16 and 24 frames per second), rapid rewind and shows "still" frames.

You can record voice and music (or sound effects on tape) separately or together, using the Kodak Sound 8 Projector. You can record, erase, re-record any time and as many times as you like. The result—you can tailor sound motion pictures to individual audiences.

Cost: less than $350.

Price is subject to change without notice.

Ask your Kodak dealer for a demonstration.

EASTMAN KODAK COMPANY, Rochester 4, N. Y.